CCSSO/CELT Decision Support Architecture Consortium (DSAC)

The State of Michigan Decision Support Solutions Report

March 21, 2005

This report was prepared for the

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Publication of this document shall not be construed as endorsement of the views expressed in it by the Council of Chief State School Officers.

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List of Abbreviations and Acronyms

Acronym	Description
ACT	ACT, Inc., formerly American College Testing, Inc.
AYP	Adequate Yearly Progress
BOE	Body of evidence (portfolio of student accomplishment against standards)
CCSSO	Council of Chief State School Officers
CD	compact disk
CEPI	Center for Educational Performance and Information
DIT	Department of Information Technology
DLEG	Department of Labor and Economic Growth
DMB	Department of Management and Budget
DSAC	Decision Support Architecture Consortium
DSS	Decision Support Systems
ELA	English Language Arts
ELPA	(Michigan) English Language Proficiency Assessment
ESL	English as a second language
ETL	Extract, transform, and load (re: data management)
FID	Financial Information Database (financial information on schools/LEAs)
GLCE	Grade Level Content Expectations
IDEA	Individual Disabilities in Education Act
IMS	Instructional Management System
ISD	Intermediate School Districts; Michigan has 57 ISDs
LDAP	Lightweight Directory Access Protocol
LEA	Local Education Agency; a.k.a. Districts; Michigan has 826 LEAs
MAIN	Michigan Administrative Information Network
MDE	Michigan Department of Education
MEAP	Michigan Education Assessment Program

Acronym	Description
MEGS	Michigan Electronic Grants System
MEIS	Michigan Education Information System
Merit	A student scholarship program housed within the Treasury Department and funded by the Tobacco Industry (Lawsuit) Settlement
MI-ACCESS	Michigan Alternate Assessment Program (for special education students)
MICIS	Michigan Compliance Information System (Special Ed)
MI CLIMB	Clarifying Language in Michigan Benchmarks (CD ROM and Web resource produced in 2002 based on 1995 state standards).
NAEP	National Assessment of Educational Progress
NCLB	No Child Left Behind
OPPS	Office of Professional Preparation Services
OSB	Office of State Budget, Department of Management and Budget
PMO	Project Management Office
PSA	Public School Academy
REP	Registry of Educational Personnel
SAMS	State Aid Management System
SCM	School Code Master (a.k.a. master list of Michigan educational facilities)
SEA	State Education Agency
SID	School Infrastructure Database (a.k.a. crime and safety database)
SIF	Schools Interoperability Framework
SIS	Student Information Management System (SIS)
SPED	Special Education
SPSS	Statistical Package for the Social Sciences
SRSD	Single Record Student Database (Michigan Student Information System)
STAR	Student Test and Achievement Repository (for state and national standardized test results and scholarship awards)
UIC	Unique Identification Code
US DOE	United States (Federal) Department of Education
WAN	Wide Area Network

Key Concepts, Constructs, and Definitions:

Analytical Data Store (ADS) – A reporting view of the data that is designed for "slicing and dicing." The data is aggregated and reflects summary data. Customized views can be developed for each agency program or operating unit. In addition, within ADS, the data can be integrated allowing for cross-subject views. See also *Data Mart and Data Warehouse.*

Architected Solution – An IT system built upon the foundation of the agency's existing technology standards and architecture. Such solutions take full advantage of the technologies, operational processes, and technical expertise already in place across the agency, facilitating easier IT systems integration, maintenance, and support.

Architecture – A set of standards, guidelines, and statements of direction that constrain the design of information technology solutions for the purpose of eventual integration.

Balanced Scorecard Process – A systematic approach to project (particularly information technology project) high-level description, resource assignment, prioritization, and performance/delivery measurement. This process is proven to be effective in building consensus across an organization around project priorities and delivery efforts. It is both a non-technical and a rigorous management process.

Infrastructure – The backbone of IT delivery, the networks, communication services, operating systems, servers, desktops, and related platforms, products and services that provide IT capabilities to the end user.

Database – A structure and efficient mechanism for the storage, description, and management of discrete data elements and bodies of agency information.

Data Element – A discrete category of data, e.g., "age," "ethnicity," "test score."

Data Mart – A subset of *Data Warehouse* data spun off to serve the specific data analysis needs of a subgroup of end users, such as a particular Agency program or operating unit, executive management, and so forth.

Data Warehouse – A centralized source of key agency data drawn from various *Systems of Record* and brought together for the purposes of data integration in line with the agency's analysis and reporting requirements.

Decision Support System (DSS) – An IT-enabled system that facilitates the integration of critical agency information so that management may employ that information to inform planning and decision-making.

Extract, Transform, and Load (ETL) – The process and IT tools employed to draw out (extract) data from *Source Systems*, to systematically alter the data (transform) to conform with the database structure of the *Data* Warehouse, and to deposit (load) that data into the warehouse.

Metadata repository – This type of repository stores data about the data, including: descriptions of what kind of information is stored where, how it is encoded, how it is related to other information, where it comes from and how it is related to overall agency functional and operational activities.

Operational Data Store (ODS) – Typically the staging platform for data moving from *Source Systems* to a *Data Warehouse* or *ADS*. The data arrives in its most detailed state reflecting the most granular transactions.

Source System – Typically a transactional IT system, such as a financial, human resources, student information, or assessment management system, that feeds the agency's *DSS System* and *Data Warehouse*.

System of Record – See *Source System.*

1.0 Executive Summary

1.1 Introduction

> *"There is persuasive evidence that high expectations and a rigorous course of study, when organized and delivered effectively, can enhance student aspiration, motivation,* ***and*** *achievement…The [Commission on Higher Education and Economic Growth; a.k.a. the Cherry Commission] working group has reviewed compelling evidence that high expectations, delivered in an engaging, contextualized, personalized learning environment, pay dividends in terms of academic achievement and high rates of success at taking the next step to college and work….The future success of its residents depends on Michigan's ability to raise the floor of preparation for* ***all*** *students, and make particular strides in raising achievement among racial minorities and within communities where achievement has been weak."*
>
> ***— The Cherry Commission's Report, Appendix D, page 82***

The State of Michigan has over its long history embraced a serious and substantial commitment to the education of its entire citizenry. Its world-renown public university system represents just one dimension of investment in quality educational programming. The fact that the State initiated high-stakes student assessments as early as the 1969 also speaks to the leadership's ongoing use of formal measurement in assessing educational program performance and in focusing the spending of tax dollars. Even in more recent, fiscally lean times, the Michigan Legislature has somewhat reduced State spending levels for school and student support while severely reducing expenditures in other government programs. As set forth forcefully by the Commission on Higher Education and Economic Growth, the State of Michigan continues to view its educational programs as the key to its social health and economic future.

To those ends, the Commission has recommended the creation of mechanisms for tracking the lifelong learning of Michigan citizens. Such a process would require those State agencies responsible for the delivery of educational programs to embrace a common, integrated approach to data management and data-driven decision-making, enabling *an engaging, contextualized, personalized learning environment* from pre-school all the way through university and adult education (i.e., pre-K to 20). This is a vast and challenging scope of activity given the disparate forms of source systems, data standards, data management practices, and government agencies that would fall within this envisioned process, especially in Michigan where the responsibilities for educational programs involve Michigan Department of Education (MDE), the Department of

Labor and Economic Growth (DLEG), the State College and University System, the Department of Management and Budget (DMB), and the Department of Treasury, to name just a few. Indeed, of the twenty-six State Education Agencies examined to date by the Council of Chief State School Officers' (CCSSO) Decision Support Architecture Consortium (DSAC), Michigan offers special structural challenges in devising an enabling decision support solution in line with the State's educational program management objectives.

Interestingly enough, these very challenges afford Michigan a unique platform upon which to build a data-driven decision making capability. First and foremost, within the Office of State Budgets (OSB), Michigan now has a Center devoted exclusively to the collection, storage, and analysis of educational data. This Center for Educational Performance and Information (CEPI) stands independently of the many educational program providers that it seeks to serve. With the general acceptance and support of its "customers" and with sufficient funding, CEPI could deliver the very enabling capabilities set forth as requirements in the *Cherry Commission Report*. Similarly, the State has centralized information technology services within a single Department of Information Technology (DIT). Like CEPI, DIT is positioned but not necessarily funded to provide a single integrated technology platform for a statewide decision support solution.

Furthermore, through a significant concerted effort, the MDE, CEPI, DIT, the States' 826 local education agencies (LEAs), and fifty-seven (57) intermediate school districts (ISDs) have achieved some fairly significant milestones towards the establishment of a comprehensive decision support system for statewide education programs and learning management. In particular, one may point to the emerging Single Record Student Database (SRSD) and Unique (student) Identification Code (UIC) system for K-12 students as well as the well established Registry of Educational Personnel (REP) system for staff certification, the Michigan Education Assessment Program (MEAP) for K-12 assessment, and the MDE and State's various Websites for information sharing and service delivery. The time has now come to build on these important accomplishments to complete a comprehensive solution set for State of Michigan decision support of educational instruction/program management.

Through a partnership between the MDE, CEPI, DIT, and the Council of Chief State School Officers' (CCSSO) Decision Support Architecture Consortium (DSAC), an external study team has worked with a cross section of SEA, LEA and other education process stakeholders to create an assessment and action plan to move Michigan beyond aforementioned foundational elements and towards information services that will more fully enable program delivery and learning for Michigan students.

In light of the federal mandates under the ***No Child Left Behind Act***, the timing of the DSAC study creates an outstanding opportunity for the MDE, CEPI, DIT, and those they serve to revisit their plans and redefine their direction in terms of

the services that must now provide to a diverse, complex set of constituencies. This study will provide an information-technology roadmap to empower and enable effective and efficient LEA performance through the delivery by CEPI and its agency partners of a suite of centralized and highly purposeful data services. This report provides the details as to how the State can realize these objectives.

From the outset, the DSAC study team would like to impress upon the readers of the Michigan study that the Consortium has taken a broad view of Agency data-driven decision making and its associated operational processes and information systems, implicit in the NCLB Act and IDEA but also aligned with a more comprehensive view of SEA roles and responsibilities. Our analytical framework which is both described in the Appendix of this report and in other documents shared with process stakeholders employs a systematic approach for decision support system assessments across the twenty-six SEAs now in the Consortium. While our recommendations are organized according to this framework, each member SEA is free to prioritize and act on these recommendations in keeping with its own needs and priorities. Furthermore, it is our view that the holistic approach of the DSAC study provides a broad perspective to better inform Agency choices around data management and decision support.

Through Michigan's participation in the DSAC, a team of system experts from the CELT Corporation have conducted a thorough assessment of where Michigan stands in its efforts to establish a framework for decision-making to improve student performance. The team's observations are organized in terms of an analytical framework and architectural model, detailed in the Appendix of this document, employed to assess the State's preparedness, in terms of its own goals and objectives, for data-driven decision support.

Key Challenges

Separate from the report's educational process focused observations, the DSAC team would also offer the following more general observations concerning the State's current capacity for data-driven decision support:

1. While the State's decision to encompass pre-K to 20 educational programs within the purview of its data-driven, decision support objectives aligns with its overall goals and objectives for Michigan educational programs, this choice adds even greater complexity to an already complex and high-risk undertaking.
2. Though the study team's sense of stakeholder effort, skills and abilities is very positive, the pressures of work and resource constraints have severely limited the time that MDE, CEPI, and DIT personnel may devote to the planning and implementation of new programs and services in response to the requirements of the *NCLB Act* and *IDEA*. The net result of these circumstances is a highly siloed approach to data management

that works against the larger objectives of the State's decision support efforts. Furthermore, to realize the objectives identified in this planning document, more management resources are required to deliver a satisfactory decision support solution set.

3. Because the entire structure of key stakeholder organizations (e.g., MDE, CEPI, DIT) is relatively new in their respective current iterations to Michigan State government, there needs to be a stronger understanding and buy-in among those who need to collaborate across the envisioned data management process.
4. With all the various stakeholders in terms of statewide educational data management, there is no clear and decisive governance of the data management process, both in terms of overall policy at the executive level and more operational data stewardship among systems of record owners.
5. Similarly, there is no strong planning process that focuses on the inter-agency alignment of goals to action plans, resources, and metrics.
6. The current data management process lacks comprehensive rules for data management, presentation, and dissemination, including clearly defined roles and responsibilities among data stewards and end users. While CEPI could provide leadership and technical support in this regard, it needs to establish stronger bonds of cooperation and support with systems of record data owners. In 2004, the State of Michigan published an Information Technology Strategic Plan which defines the target technical architecture framework to support the State's government. DIT needs to finalize a recommendation for a technical architecture for CEPI's decision-support services aligned with the State's target architecture.
7. The overall effort lacks more formal partnering arrangements among the agency stakeholders (i.e. MDE, DLEG, CEPI, DIT, etc.).
8. Both existing Federal and State mandates as well as those implied and anticipated in the *Cherry Commission Report* lack the necessary human and financial resources within the MDE, CEPI, and DIT to get the job done.

In completing this study, the DSAC team firmly believes that an opportunity exists for CEPI to position itself as the enabling data management service to support Michigan in achieving its own and NCLB's educational performance standards. This study identifies the steps required to build and service this capability for the collaborative benefit of the State's LEAs and the students they serve. ***Like all of the SEA reports generated by DSAC, the Michigan study includes many components. Section 4 of this report suggests how these components might be staged and phased into operation over a five-year period. For this very reason, we first recommend the creation of a master data management plan that clearly prioritizes the sequencing of activities and the roles, responsibilities, and required resources associated with any decision support system rollout.*** We also encourage the State's educational leadership to consider a more comprehensive and robust approach to LEA data collection and decision support services. In constructing such an offering, its value to the

State's Agencies, ISDs, and LEAs will become quite clear. By providing both the integrated data and tools for informed planning and decision making locally, a centralized CEPI service will both build the collaboration required to ensure the timely and accurate flow of data from Michigan schools and districts to the U.S. Department of Education, and ensure that the participating State Agencies, Departments, DIT, and CEPI receive the authorizations required to fund and maintain the undertaking.

1.2 Major Recommendations by Core Process

This section provides descriptions of the report's recommendations to move from the current to the targeted environment within each of the DSAC model's six core SEA processes. Many of the recommendations involve the partnering of various Agencies and Departments, DIT, and CEPI to provide additional services that enable and strengthen local decision making and action at a cost far lower than if undertaken by an individual LEA. Please see Section 2.0 for a complete discussion.

1.2.1 Set Academic Standards and Curriculum

Recommendations

1. Establish grade-level and subject-specific content expectations as a database, converting existing static hardcopy and PDF documents to a dynamic, Web-based service accessible to educators across the State.
2. As an extension of this service, align curriculum resources – sample lessons, test plans, etc., with grade-level content expectations.
3. Deliver these Web-services through an educational services-portal (a.k.a. e-portal) that would also disseminate standards, curriculum, and benchmarking information.
4. Employ this e-portal as the platform for the incremental delivery of broad-based learning/instructional management services.

1.2.2 Administer Performance-based and Standardized Assessments

Recommendations

1. Reengineer the MEAP process so that test results reach the appropriate schools and educators in a timelier manner, allowing for informed interventions in the same academic year as the exam.

2. Provide formative (a.k.a. interim) testing/benchmarking at the item level by grade; ensure that these new services align with grade level content expectations.
3. Create a library of test items based upon historical MEAP materials and distribute these test items via a searchable database running on the e-portal. Through a centralized service, the item test bank would be employed at the discretion of the LEA. To that end, leverage the test item resources already available through the Michigan Virtual University.
4. Collect formative test data as a CEPI data warehousing service to inform interventions at the LEA level, enabling data-driven educational reform at the district and school level. As a corollary to this service, redefine MDE field service strategies.
5. Use the e-portal to help identify and publicize LEA best practices in the use of assessment data for student and school improvement.

1.2.3 Certify Educators

Recommendations

1. Better integrate and secure educator and staff demographic, certification, endorsement, job assignment, and job history data. Within that service, require a UIC or PIC (some staff already have the PIC) for educators and staff as well as role-based authentication and permissions.
2. Track what teachers actually teach against where they work, their job history, and what they know (certificates and endorsements).
3. Map teacher assignments by school, by class, by student, and by student performance over time, employing said data locally to inform educator professional development planning.
4. Extend REP to accommodate educator electronic portfolios and the acceptance of electronic transcripts from institutions of higher education as the later become available.
5. Provide secure access via the e-portal to Certification records for the online correction of errors and other self-servicing features.

1.2.4 Conduct Data Driven Analysis and Interventions and Manage Accountability Systems

Recommendations

1. Provide an online AYP process tool set for LEA use that enables current school-specific assessment as well as district and State benchmarks' that rolls up AYP findings to the LEA and to the SEA level. Tools should integrate with data warehouse using

presentation of data and automation to guide effective decision-making. Here again the DSAC team sees an opportunity to leverage e-portal services.

2. Deploy formative (interim) assessment services as a data-driven, proactive service offering to enable LEA action prior to the high stakes measurement cycle.
3. Track the development and implementation of school improvement plans, highlighting best LEA practices as to what interventions yielded what improvements.
4. Leverage these capabilities to address the data-driven decision-making, reporting, and data tracking needs for post secondary educational services and State job training programs per the recommendations of the Cherry Commission.

1.2.5 Manage Grants and Monitor Compliance

Recommendations

1. Streamline and rationalize existing processes and workflows, resulting in a single management system and the elimination of multiple and redundant data entry work.
2. Integrate the grants data collection process with CEPI's data services to eliminate redundant data capture.
3. Similarly, employ a single e-grant system to manage both State and Federal grants, affording access to current and historical financial information pertaining to SEA and LEA's grants in line with school and student performance, while saving maintenance funds over time.
4. The State should assess the merits of managing both grants and aid funding through a single information system that looks to SRSD for its student information but then adds in all of the necessary functionality to manage grants and aid application, distribution, and auditing processes.

1.2.6 Collect and Report Data

Recommendations

1. Through CEPI, deliver the data warehousing and data mart services platform required by State agencies and the LEAs.
2. n conjunction with this data management platform, provide an extensive but easy-to-use interface that will deliver to educational process stakeholders' information on a 24x7 basis via the Web through querying capabilities and more formal reporting.

3. To secure and provide access to the aforementioned database and Web-enabled services, establish a security and access control service based on both unique user authentication and the alignment of the UIC with specific system roles and permissions.
4. For owners of source data, data cleanup must become a priority. CEPI should provide assistance, direction, and support to these efforts as well as introduce an automated data clean-up processes.
5. Decision Support Systems (DSS) governance needs to quantify the ongoing benefits of its DSS solutions in terms of labor savings, staff redeployment, data quality, and the enhancement of data access and usability at the State Agency and LEA levels.
6. Leverage these capabilities to address the data-driven decision-making, reporting, and data tracking needs for post secondary educational services and State job training programs per the recommendations of the Cherry Commission.

1.3 Recommended Projects

The table below identifies and briefly describes the projects that are recommended by this report. Some of these are already in progress. For example, work is already underway to enhance the SRSD offering, to extend the use of UIC functionality, and to make MDE standards more widely accessible via the Web. The plan of action summarized below brings these and other tasks within a single, unified, and rationalized decision support architecture framework.

Project No.	Project Name	Project Description
Project 1	Data-Driven Decision Support Architecture Master Plan and Governance Structure	Create a single unified plan for the management and oversight of decision-support projects to ensure the alignment of schedules, resources, project dependencies, and personnel, as well as the delivery of an architected solution set. Also, create a governance process that involves and commits all key stakeholders. If DSAC were to be engaged to produce this plan, the deliverables for this foundational effort would include: • an overall data management strategy • a governance structure for data management • documented workflows and processes for data management, analysis and reporting • stakeholder roles and responsibilities in these data management processes

Project No.	Project Name	Project Description
Project 1 (cont'd)		• a logical architecture for source systems/data flows • a high-level logical diagram for educational data • a high-level metadata directory model • a technical architecture for an end-to-end data management solution, including related hardware and software recommendations that leverage existing State IT investments • a high-level project plan, including time lines, staffing levels and competency requirements, and associated costs/budgets for delivery of DSS solution components • components for associated DSS request for proposal (RFP) documents • ongoing consultation, project management and support in deal with DSS product/service vendors during the first year of DSS implementation
Project 2	Extension of the UIC Process to all Agency Systems of Record	Strengthen the process for automatically created unique IDs; work with systems of record to introduce the use of the UIC into those systems and to keep them current and synchronized with the UIC process; extend the UIC process to apply to educators and staff as well as students.
Project 3	Extended Directory Services	Extend the process for the issuance of unique student, educator, and staff IDs to embrace role authentication and permissions management. Thereafter align access to new/emerging Web-services, like those for formative testing and the distribution of grade-level and subject-specific content, with the directory services function.
Project 4	Educational Portal (a.k.a. e-portal) as the core platform for a comprehensive Web-services strategy	Create a master plan for Web-services that defines in detail comprehensive and complementary offerings, including: • virtual schools (course management) • grade-level and subject-specific content and supplement content (individual learning management) • online professional development for staff • digital content libraries, etc.

Project No.	Project Name	Project Description
Project 4 (cont'd)		• formative testing and test data banks • decision support service querying and report access; associated data clean-up activities.
Project 5	MEAP Formative Assessments and Test Item Banks	Develop a Web-based assessment platform delivered through e-portal which will provide a choice of diagnostic and formative assessments for use by districts. It will draw on the substantial number of released MEAP test items. Once a diagnostic/formative assessment is developed by a district, it can be delivered online or printed and scored, with the results posted online for further analysis. Remedial or extension resources can be recommended based on the results of the tests. This project might be best addressed through the statewide use of a learning management system working in conjunction with e-portal but for a start some modest enhancements to the existing MEAP services could serve as a pilot for the more extensive undertaking.
Project 6	Architected Platform of Decision Support Services: Planning, Design and RFP Development	Develop a comprehensive set of business (functional) and technical requirements for an end-to-end decision support system solution based upon DSAC's architectural frameworks and recommended standards. Assess existing DIT capabilities, services, and products in light of the emerging DSS requirements and where gaps exist, seek externally available products and services. Throughout this process ensure that stakeholders consider the total cost of ownership when selecting IT products and services.
Project 7	Data Warehouse/Data Mart Platform	Construct a data warehouse that stores the historical/time-stamped data concerning student information, student assessment, educator/staff job history, and certification, financial data, and so forth. Subsets of data by LEA and school should also be made available. Project will involve data modeling, data validation and cleansing, data transformation, and data transfer.

Project No.	Project Name	Project Description
Project 8	Data Reporting and Analysis Platform	Construct a user-friendly tool set for self-directed data selection, analysis, and presentation by end users. The resulting service will allow stakeholders to select and analyze subsets of State data-based upon their respective roles and permissions and to produce reports as needed.
Project 9	School Improvement Planner (a.k.a. AYP Tool Kit)	Provide each LEA/school with its own school improvement-planning tool through the e-portal that draws down aggregated high-stakes and formative assessment data to inform the intervention and planning processes to assist current state required process. This tool will be updated on a regular (at least annual) basis as MEAP data is made available so as to provide data-derived benchmarks and metrics for each school planning team. This same system would also roll-up both planning objectives and associated performance results to better inform the MDE interventions team as they plan for the allocation of intervention resources and other services to the LEAs and schools. Furthermore, the data derived from the School Improvement Planner will allow for the longitudinal tracking of LEAs over time and in relation to interventions, additional funding, the use of best practices, and so forth.
Project 10	e-Grants and Financial Data Enhancements	Reengineer and streamline the existing processes around a single unified database structure that relies upon, where appropriate, the CEPI operational data store for current student information, UICs, etc., and that allows for the tracking of State and Federal grants within one unified system.
Project 11	Project Management Office	To enable CEPI and stakeholders across Michigan State government to successfully deliver the aforementioned decision support system projects, DSAC will provide support and assistance to CEPI in associated IT architectural design, project management, and project delivery. These efforts will include a balanced scorecard process – i.e., a systematic approach to project (particularly information technology project) high-level description, resource assignment, prioritization, and performance/delivery measurement.

Project No.	Project Name	Project Description
Project 11 (cont'd)		This process is proven to be effective in building consensus across an organization around project priorities and delivery efforts. It is both a non-technical and a rigorous management process.

1.4 Summary Table of Scored Findings

The DSAC Project team has employed a rigorous, standards-based framework to assess Michigan's readiness for statewide instruction and program enabling decision support. The Consortium's model is diagnostic in nature and serves as a checklist in facilitating the field team's assessment process. The actual application of this model for the State will depend upon the current condition of Michigan's educational program policies, process, and available human, financial, and technical resources; the State's targeted objectives; and its priorities in closing the gap between what is in place today and what Michigan wishes to achieve over the near term.

Each dimension of the State's related data management and decision-support capabilities is scored on a four-point scale from "0" to "3." The study team's key findings are highlighted according to a color coded of green-yellow-red to signify our understanding of their relative strength within the context of the State's overall capabilities. Red indicates an area in need of redress. Yellow indicates an area where considerable progress has been made, however, more work needs to be done. Green indicates an area of commendation and best practice. In brief, the table that follows summarizes the key recommendations of the Michigan study by the DSAC team.

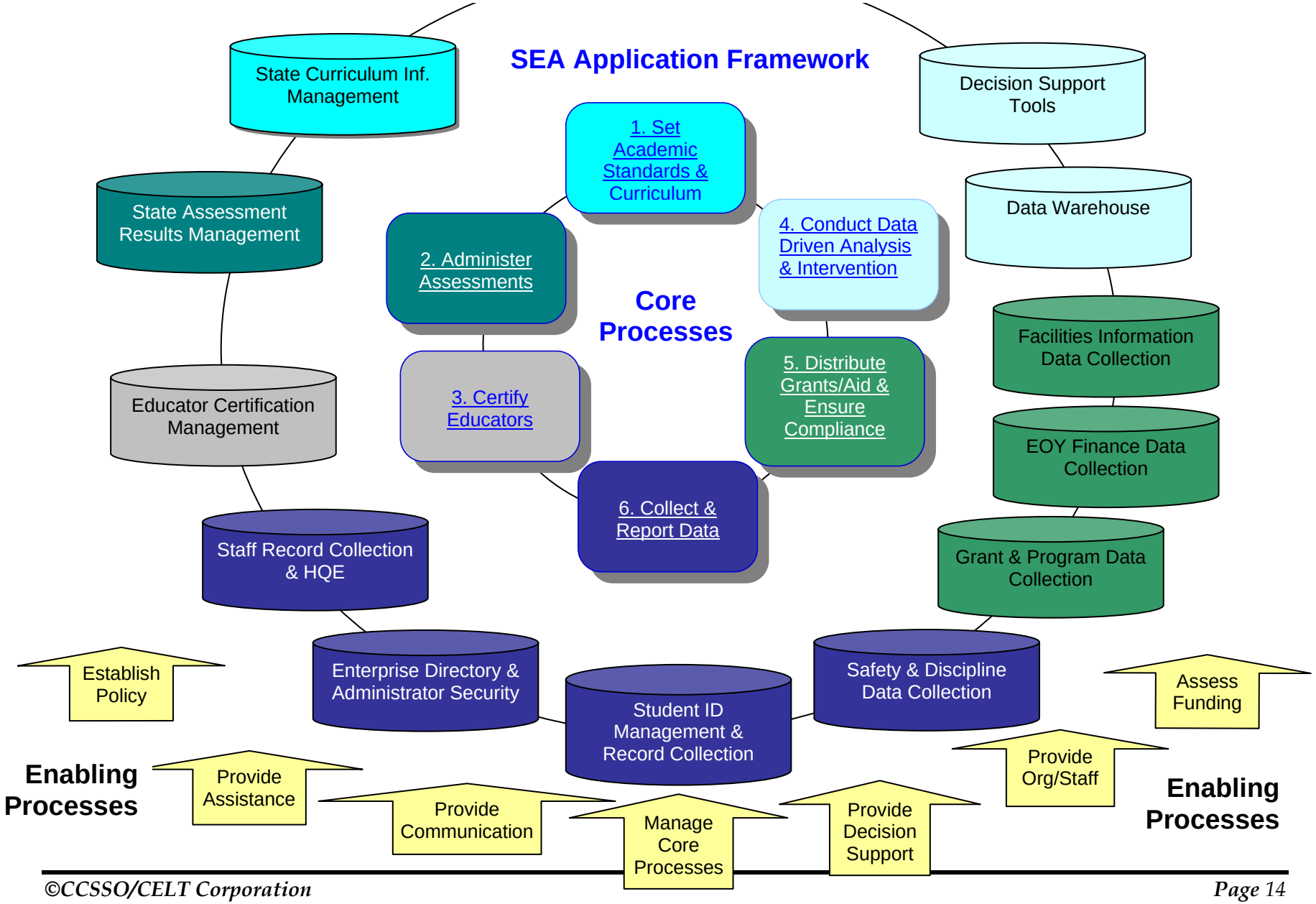
Taken together, these metrics afford the study teams a balanced and consistent methodology in assessing individual Michigan educational goals and objectives against the organization's current state of preparedness. Furthermore, these measures establish a method of comparison among State Departments of Education – not to rank one over another but rather to identify best practices to be emulated and areas of common need. In turn this information will help the CCSSO Decision Support Architecture Consortium team to focus our efforts in service of the Consortium's membership.

The following is the DSAC team's summary assessment of the Michigan's **current** decision support capabilities **relative to its target environment** for each of the Consortium's six-core process model, the respective seven enabling processes for each core process, and the twelve associated information technology application sub-systems. An explanation of the model and associated rubrics governing the scoring process may be found in Appendix A.

Core Processes	Enabling Processes: 1. Establish Policies	2. Provide Technical Assistance and Staff Development	3. Publish Information and Provide Communication	4. Manage Business Processes	5. Provide Enhanced Decision Support	6.Provide Organization/Staffing	7. Assess Funding Needs	Technology	
1 Set Academic Standards and Curriculum	1.5	2	2	1	0	1	0	0	State Curriculum Management
2 Administer Assessments	2	2	1.5	1.5	1	1	1	1.1	State Assessment Results Management
3 Certify Educators	3	2	2	2	1	1	1.5	2	Educator Certification Management
4 Conduct Analysis / Interventions	2	2	1.5	1.5	1	0	0	0	Data Warehouse
								0	Decision Support Tools
5 Distribute Grants / Aid and Ensure Compliance	2	2	2	1	1	1.5	1	2	Grant and Program Data Collection
								2	End of Year Finance Data Collection
6 Collect and Report Data	2	2	2	2	2	1	0	2	Enterprise Directory + Security Portal
								2.3	Student ID + Record Collection
								2	Safety and Discipline Information Data Collection
								2	Staff Record Collection & Highly Qualified Determination
								2	Facilities and Technology Plan Data Collection
	2.1	2.0	1.8	1.5	1.0	0.9	0.6	1.5	**Summary Scores**

As should be immediately evident, there is a substantial gap across all six-core processes. Through the DSAC assessment tool it is clear that while in terms of policy, technical support, and processes, the MDE has at least adequate services in place, the team of State agencies jointly responsible for pre-K to 20 data-driven decision support are clearly deficient in terms of the staffing, funding levels, and decision support systems and tools required to support Michigan's LEAs in the realization of the State's educational goals for its students. In brief, this study's representation provides a roadmap for closing the gap in MDE capabilities through the proposed projects described in Section 4.0 of this report but only if the agencies involved also receive the necessary staffing and funding levels to both initiate and sustained these recommended services over time. The remainder of this report provides all of the details and supporting documentation of the MDE's current status, target environment, and the DSAC team's recommendations for each of the six core processes and their accompanying application components and enabling processes. To aid the reader in navigating this document, the DSAC framework diagram is shown below.

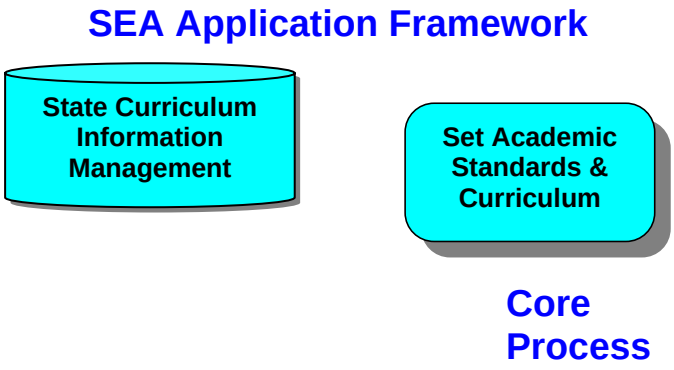
Architecture for Decision Support



2.0 Existing and Target Environment

2.1 Core Process 1: Academic Standards and Curriculum

Application Framework Component: State Curriculum Management System (learning standards, courses). This process identifies, defines, refines, communicates, and monitors the State's standards for learning by subject and grade. In some States this includes the naming of courses and the establishment of course requirements. This process may also include statewide textbook selection and the selection of instructional management tools for the LEAs to use.



2.1.1 Current State

Within the State of Michigan, public education programming, and delivery enjoys a long and well-established history of local control. Thus while the Michigan Department of Education (MDE) does provide standards, curriculum frameworks, and benchmarks for most subject areas, LEAs and school systems are under no obligation to adopt them. Interestingly enough the responsibility for state standards and curriculum development falls to the MDE's School Improvement Unit which has published these frameworks for the past ten years. Until recently the frameworks did not provide grade-level and subject-specific content expectations. There is work to be done in aligning these new Grade Level Content Expectations (GLCEs) with the instructional management and program delivery needs of the schools and with increasing rigorous assessment criteria of the MEAP process.

The recent reorganization of the MDE and its School Improvement Unit, in particular, have cast a sharp light on the gaps in current MDE offerings. The current system focuses primarily on disciplines which have secured federal funding, with other disciplines receiving lesser attention. Initially

the standards were defined in multi-grade bands. The MDE now has grade-by-grade expectations to support testing every student every year (currently K-8) in line with the assessments strategy summarized in section 2.2 of this report. The Unit does offer both Web- and CD-based training for educators and school administrators for all standards and benchmarks now in place, but there is a need to replace/update instructional resources such as MICLIMB based on the older grade-span standards to provide the same kind of value for GLCEs.

LEAs are encouraged to use the curriculum frameworks in the development of their curriculum but their use is voluntary. The state requires all students to take its high stakes tests to assess the degree they are proficient with State standards. The mandated assessments have led most LEAs to align their curriculum to the standards. If the State is not testing in each content area each year, MDE has no way of knowing if the districts are using the state curriculum standards in those areas.

2.1.2 Target Environment

Going forward, the MDE recognizes the need to structure all of the State's standards and curriculum by grade, by subject, by component and mastery indicators, aligning this content to student assessment, instructional resources, and teacher development. To facilitate adoption, the School Improvement Unit would like to offer online, interactive training and tools for educators to assist them in the building and delivery of lesson plans as well as related instructional/learning management tools; system. Similarly, the School Improvement Unit would like to see formative assessments integration with the curriculum development process. To enable this process the team would like to have access to a content/document management system for authoring standards, curriculum, and benchmarks and for sharing this content over the Web.

As part of the Unit's interventions strategy, they would like to maintain a portfolio of data for each school at risk so that they might follow the process of those schools over time against MEAP and other key indicators. With portfolio information in hand, the MDE would extend and focus its "coaches institute" of retired principals and other independent contractors to assist high priority schools. To make the best use of these resources and those already at hand, the MDE will also need a student performance management system that delivers data at the school level so that they may analyze grade level content mastery correlated to grade and subject-specific content expectations.

2.1.3 Enabling Process Gap Analysis Table

The table below assesses, relative to the seven enabling processes in the DSAC model, where the MDE stands relative to its target environment for Academic Standards and Curriculum. The table employs a rating system that ranges from "0" to "3" to address the degree to which each of the enabling processes, identified in the DSAC framework, support the target environment. The rating for each element is as follows:

- A score of "0" means that the enabling process is completely inadequate for meeting the target environment.
- A score of "1" means that the enabling process is partially adequate for meeting the target environment.
- A score of "2" means that the enabling process is satisfactory for meeting the target environment.
- A score of "3" means that the enabling process has already reached the target environment.

Set Academic Standards and Curriculum		
Enabling Process	**Score**	**Status Relative to Target Environment**
Establish Policy	1.5	• Michigan legislation currently limits the scope of MDE involvement in curriculum development even though it would appear that the LEAs would prefer a larger role by the State.
Provide Technical Assistance and Professional Development	2	• While the MDE does provide, through Websites, CDs, paper documents, and workshops, some help to LEAs in the translation of standards into curriculum, most help has come instead from universities, colleges, and ISDs. • There is a need for more robust online resources that support exemplary standards-based instructional development and delivery. • Professional development and training opportunities and informational materials are available through the Web, but such offerings are modest in terms of their range and depth of coverage. • In general, the focus of these activities is toward those schools and districts who do not meet their AYP objectives.

Set Academic Standards and Curriculum		
Enabling Process	**Score**	**Status Relative to Target Environment**
Publish Information and Provide Communication	2	• The SEA publishes standards information on its Web and encourages public as well as professional review and comment. • The SEA uses content committees staffed by subject matter experts and extensive comment sessions, over an extended period of time, to develop standards, curriculum frameworks, and benchmarks.
Manage Core Process	1	• A well-defined process for LEA, higher education, and other sources of input is in place. • There is no data-based catalog of standards that defines grade-level and subject-specific content expectations nor are their mechanisms in place that tie this data to the assessment process to ensure alignment between educational programs as delivered and the associated measures of student performance. • There is no process in place for tracking standards adoption; and, therefore, no involvement by other parties, such as institutions of higher education, in this process. • The SEA has a process for reviewing and modifying standards against benchmarks, but not for curriculum. Curriculum is solely the domain of the LEAs.
Provide Enhanced Decision Support	0	• There is no capability through which LEAs may mine GLCE standards and employ these to build curriculum, lesson plans, et al.
Provide Organization and Staffing	1	• The new structure of the School Improvement Unit is just settling in. • Even at this stage it is clear that the Unit is understaffed and not empowered to achieve the agenda that the MDE and the LEAs would like to see realized. • The SEA does not monitor LEA standards compliance and curriculum development. These functions are all done at the LEA level without SEA involvement.

Set Academic Standards and Curriculum		
Enabling Process	**Score**	**Status Relative to Target Environment**
Assess Funding Needs	0	• The SEA relies largely on external (primarily Federal) grants funding for any initiatives and even for some process maintenance. Because the federal focus of late has been accountability and assessment, resources have not been available for standards and curriculum development.

2.1.4 Technology

The following describes the characteristics of the applications that support standards and curriculum for Michigan:

Associated System	Score	Status Relative to Target Environment
Learning Standards Database	0	• Not in place.
Education-portal	0	• Though MEIS does provide secure access to authorized users of SRSD, REP, and SID and though Websites (both Internet and Intranet) are in place for the sharing of static information, the web services envisioned as part of the MDE's target environment are not in place today.

2.1.5 Recommendations

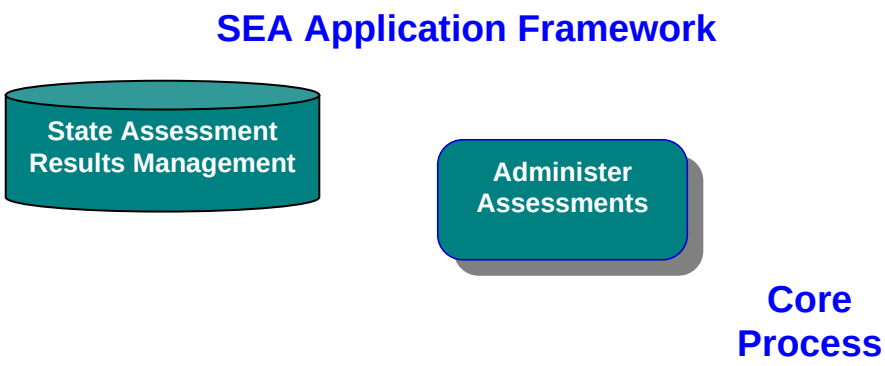
The following recommendations will help Michigan move from the current to the target environment:

1. Establish grade-level and subject-specific content expectations as a database, converting existing static hardcopy and PDF documents to a dynamic, Web-based service accessible to educators across the State.
2. As an extension of this service, align curriculum resources – sample lessons, test plans, etc., with grade-level content expectations.
3. Deliver these Web-services through an educational services-portal (a.k.a. e-portal) that would also disseminate standards, curriculum, and benchmarking information.

4. Employ this e-portal as the platform for the incremental delivery of broad-based learning/instructional management services.
5. Expand e-portal services to include a Web-based database application to develop and manage state curriculum frameworks and district curriculum through the creation, review, approval, publication, access, and search processes, and to allow for the creation and sharing of lesson plans aligned with State standards and district curriculum.
6. Extend the educator workspace within e-portal to accommodate lesson plan development and exchange, with linkage to standards and learning resources. It could also allow districts to construct, manage, and share their curriculum and align it to state standards.

2.2 Core Process 2: Administer Performance-Based and Standardized Assessments

Application Framework Component: State Assessment Results Management System. This is a process to define the performance criteria for students against State standards as well as a method for assessing and reporting each student's progress relative to these criteria.



Assessment is a key component of the technology for instructional improvement since test results are the basis for a wide variety of activities from instructional interventions in the classroom to Adequate Yearly Progress (AYP) driven intervention at the state level.

2.2.1 Current State

The State of Michigan has offered its students a comprehensive assessment process since the 1970's. As such the State is one of the most seasoned exemplars of high stakes testing in the country today. The Michigan Educational Assessment Process (MEAP) includes at least one annual high-stakes test in all core subjects (reading, writing and math) for grade levels three through eleven, with a body of evidence (BOE) provided for each child to document that standards (skills based) are met for graduation. For adult education, the State assesses student readiness at entry to a course of training and then after ninety hours of instruction.

As a process, MEAP offers both multiple-choice and open-ended questions with the exams provided by and scored through a third-party service. At least summary student performance results are returned within eight weeks to schools and district administrators. Test results are provided by sub-group, school, grade, and district. Performance data is

disaggregated to show the NCLB subgroups by school. Data is available to the student and teacher level. In theory for K-12, detailed test data is available prior to the end of the school year but for high schools that test in April/May, the results are not available until the summer. In should be noted that the process does not always deliver data in a timely manner. Some annual cycles have been so delayed that the students have moved on to another grade or school before their performance data reaches the school. In such instances, the data is merely discarded since it cannot be acted upon.

The MDE does not sponsor a formal interim or formative assessment process. However, many of the State's ISDs have entered into this type of effort, including the creation of item test banks. For the ISDs formative testing services is a source of revenue. There is no way to currently measure the benefit of these services that come and go with LEA support. The MDE does offer item test banks for high school students and also for students with disabilities (MiAccess). The MDE also accepts input from LEAs, ISDs, and schools as well as from panels of subject matter experts as they craft new MEAP test items.

The assessments for Michigan include/or will include:

Grade	3	4	5	6	7	8	9	10	11
English/Language Arts	**Reading Only**	✓	★	★	✓	★	★	★	✓
Math	★	✓	★	★	★	✓	★	★	✓
Science			✓			✓			✓
Social Studies			✓			✓			✓

Legend: ✓ - Current MEAP tests
★ - Future MEAP tests

In the 2005/2006 academic year, the MDE will expand and change its assessment process through the following set of steps:

- In line with NCLB requirements, grades 3, 4, 5, 6, 7, and 8 will be tested in both math and ELA.
- The tests for elementary and middle schools will be held in October rather than January/February so as to provide data in a more timely manner for student interventions.
- Social studies tests will be moved to grades 6 and 9.
- Science tests will be moved to grades 5 and 8.

2.2.2 Target Environment

Looking ahead, the MDE Educational Assessment and Accountability Unit plans to re-evaluate and change the pattern of high school testing by Spring of 2007 or sooner, depending upon the results of USDoE review of MEAP. In addition, the MDE plans to incorporate college entrance test content into its high school testing and will involve both ACT, Inc. and the College Board (for SAT exams) in this effort. This process in turn will need to be aligned with State standards and will necessarily impact criteria for the issuance of Merit Program awards.

The MDE also wishes to improve and broaden the assessment process for students with disabilities to encompass more skills and kinds of disabilities. While ESL learners have been assessed through MEAP since the mid-1970s, this has been an adhoc process. Going forward, as dictated by *NCLB* and *IDEA*, ESL assessment will become more comprehensive, systematic, and rigorous.

Most importantly, the MDE Educational Assessment and Accountability Unit would like to proceed with measuring student growth year to year, tracking performance across test cycles. This effort raises serious psychometric challenges to tracking and making meaningful comparisons in student progress across adjacent grades. The MDE also wants to invest in the measurement of college readiness among high school students through a formative/end-of-course assessment and feedback process. Similarly the MDE would also like to get more involved more broadly in statewide formative assessments in partnership with LEAs and ISDs. Many ISDs and LEAs look towards standardization and would appreciate a state standard or recommendation for formative assessments. To those ends the MDE Educational Assessment and Accountability Unit recognizes the need to invest further in process reengineering around student tracking, data collections, reporting, the universal adoption of the UIC, and an appropriate suite of analysis tools/services.

2.2.3 Enabling Process Gap Analysis Table

The table below assesses, relative to the seven enabling processes in the DSAC model, where the MDE stands relative to its target environment for Administer Assessments. The table employs a rating system that ranges from “0” to “3” to address the degree to which each of the enabling processes, identified in the DSAC framework, support the target environment. The rating for each element is as follows:

- A score of "0" means that the enabling process is completely inadequate for meeting the target environment.
- A score of "1" means that the enabling process is partially adequate for meeting the target environment.
- A score of "2" means that the enabling process is satisfactory for meeting the target environment.
- A score of "3" means that the enabling process has already reached the target environment.

Administer Assessments		
Enabling Process	**Score**	**Status Relative to Target Environment**
Establish Policy	2	• A high stakes assessment process is defined by Michigan statute, defining the role of the SEA and the LEAs regarding annual assessments. • There is no complementary policy governing formative/benchmark assessments. This objective is targeted for the future.
Provide Technical Assistance and Professional Development	2	• The SEA does provide LEAs with training on how to use assessment data to improve student performance • The SEA provides Web-based information and workshops and/or instruction in support of the assessment process and use of TestWiz. • There are no Web-based course offerings that help LEAs or schools understand/interpret assessments.
Publish Information and Provide Communications	1.5	• There is a formal process for communicating summary assessment results - hardcopy reports to the schools and districts and PDFs on a secure Website. • Student specific/detailed results are not always available in a timely manner during the course of the current academic year; the timing of tests will change in response to this problem but process issues remain. • There is a formal process for communicating changes to assessments and the assessment process to LEAs through a MDE listserv to school superintendents and MEAP coordinators. Website and help desk services are also available.

Administer Assessments		
Enabling Process	**Score**	**Status Relative to Target Environment**
Publish Information and Provide Communications (cont'd)		• The MDE offers six regional conferences a year that highlight process changes and a video conference to folks who manage the process in the schools.
Manage Core Process	1.5	• The process is well managed and is communicated relying largely on an external vendor for actual testing and scoring results delivery. • The timeliness of results delivery to the LEAs has been an issue, but proposed process changes may improve the timeliness of delivery.
Provide Enhanced Decision Support	1	• LEAs receive the data as well as the TestWiz application to analyze assessment results locally. ISDs provide the training on TestWiz. • Workshops are offered on data analysis, but the fact is that the MDE does not at present possess a data management infrastructure of the longitudinal analysis of assessment data at the individual student, teacher, and program offering level.
Provide Organization and Staffing	1	• Current staffing are not sufficient in light of existing service offerings. Should the MDE adopt a formative testing/data bank of test items service, more analytical services, and/or an extension of ESL and SPED assessment services, more personnel will be required.
Assess Funding Needs	1	• No mandate or funding for delivery and support of formative assessments. Any work in this area is funded entirely by the LEAs themselves without SEA participation and knowledge. • The SEA has adequate funding for MEAP development, delivery, and scoring for the present but would require additional funding to implement the programs recommended in this study.

2.2.4 Technology

The following describes the characteristics of the applications that administer performance-based and standardized assessments for Michigan:

Associated System	Score	Status Relative to Target Environment
MEAP	1	• The execution of MEAP services is currently outsourced to Measurement, Inc. of Durham, NC. • No data warehousing exists for longitudinal analysis and no support of the LEAs in their analysis of the data beyond TestWiz. Other than the higher-level summary analysis and scoring, little is done with the data by the LEA. For decision support purposes, more could be done with a data warehouse of exam results over time and with the right analytical tools.
Assessments Analysis Tool	1	• TestWiz is proprietary software and difficult for some to use. TestWiz is particularly weak in its ability to display data, especially graphically. This tool needs to be replaced with either a service or tool set that allows for more complete integration with other student and school data via a data warehousing solution to enable assessment-driven decision support.
Formative Test Database	0	• There is no statewide formative/benchmark assessment given or available at this time, although some LEAs and ISDs may pursue formative testing on their own.
Formative Testing Results Repository and Analytics	0	• None in place at present.

2.2.5 Recommendations

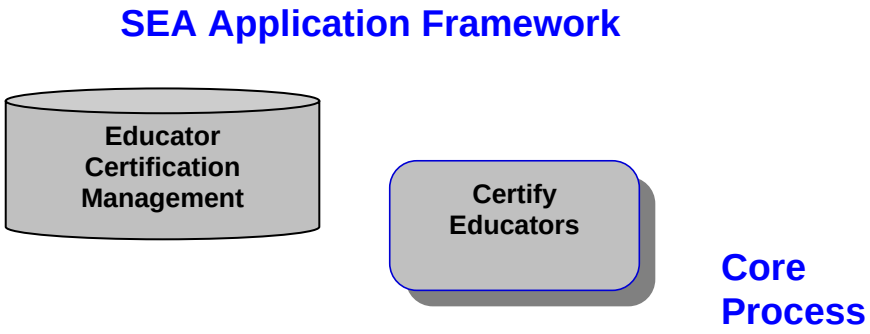
The following recommendations will help Michigan move from the current to the target environment:

1. Reengineer the MEAP process so that test results reach the appropriate schools and educators in a timelier manner, allowing for informed interventions in the same academic year as the exam.
2. Provide formative (a.k.a. interim) testing/benchmarking at the item level by grade; ensure that these new services align with grade level content expectations.

3. Create a library of test items based upon historical MEAP materials and distribute these test items via a searchable database running on the e-portal. Through a centralized service, the item test bank would be employed at the discretion of the LEA. To that end, leverage the test item resources already available through the Michigan Virtual University.
4. Collect formative test data as a CEPI data warehousing service to inform interventions at the LEA level, enabling data-driven educational reform at the district and school level. As a corollary to this service, redefine MDE field service strategies.
5. Use the e-portal to help identify and publicize LEA best practices in the use of assessment data for student and school improvement.
6. Offer a complimentary service to process and analyze formative test results so as to both inform MDE's own intervention services and to enable a more proactive approach among the LEAs themselves in working with at risk students, programs, and schools.
7. Introduce a tool set and a body of standard management reports for district and school administrators as well as for educators that allow these parties to examine the performance data for their respective cohorts of students. Provide associated, ongoing training and support for this new tool set – either directly or in partnership with the ISDs.
8. Through CEPI data warehousing services provide an integrated view of performance data against the backdrop of demographic and other key data elements.
9. Replace TestWiz with a Web-services delivery model for data analysis and report.
10. Deliver in a timely manner, MEAP results to the envisioned statewide school improvement-planning tool so as to inform local AYP planning efforts.
11. Tune and improve the UIC process to handle as many of the anomalies as possible, and reduce the manual interventions which are causing duplication and bad data. Consider implementing industry standard matching algorithms and software.

2.3 Core Process 3: Certify Educators

Application Framework Component: Educator Certification Management. This is a process to document teacher and educational administrator competency levels as related to the State standards and to certify teachers who have achieved the proper level of competency.



2.3.1 Current State

Like most local control States, most of the responsibility for the hiring, monitoring, retaining, and compensating of educators and other school personnel in Michigan rests with the LEAs. By statute, the MDE is authorized to approve teacher preparation institutions that issue teaching certificates and to assure that teachers meet NCLB highly qualified requirements. This same body of law mandates that any and all Michigan public school educators must obtain "highly qualified" status if they are to be credentialed by the State. The two primary information systems employed to manage this process are License 2000 and the Registry of Educational Personnel (REP). The former tracks both certification and endorsement statuses while the latter tracks human resource data, teaching assignment history, professional development, highly qualified educator statuses and the like. The REP system also assigns a personnel identification code or PIC that is similar in function to the UIC for Michigan students.

Through License 2000, some thirty-three (33) State institutions of higher education send electronic or paper recommendation rosters of newly certified, recertified, and newly endorsed graduates to the MDE Office of Professional Preparation Services (OPPS). Out-of-state applicants must submit a formal transcript for certification and endorsement recognition directly to OPPS. At the current time, this process is only semi-automated, employing Microsoft Access Database templates, but the DIT has a project underway to rebuild the system with a Microsoft SQL Database backend and a Web services front end for both initial data entry

and subsequent database updating and clean up. Communications of certifications and endorsements to Michigan schools is still handled manually by the teacher submitting the original employer's copy of the teaching certificate to the appropriate school administrator. The Teacher Verification Website is available for public access to view all teaching credentials and endorsements held by each Michigan educator.

The REP system stores a large body of information on each educator employed in the K-12 system. However, for the "highly qualified" (HQ) field, the only information that is carried is either "Y" (yes) or "N" (no), leaving it to the LEA to make the appropriate determination of educator status and merely recording the final decision in the REP database. It should be noted that all teachers certified in Michigan since late 1992 are highly qualified to teach in both their major and minor fields of concentration. The Michigan Test for Teacher Certification (MTTO) Act as passed by the State legislature has made "highly qualified" a condition for certification. Going forward, the MDE plans to work with Michigan Colleges and Universities to establish a more formal process for their involvement in the HQ designation.

Recertification is entirely the responsibility of the individual educator, and typically, his/her school principal. Each Michigan certificate indicates when it will expire and, on the reverse side of the document, the process to be followed for recertification. There is no formal reminder process in place. However, it is common practice for the LEA administration to notify their teachers in the year that their certification expires. Currently the database includes approximately one hundred thousand (100,000) active teachers and an additional four hundred thousand (400,000) inactive teachers. There are processes in place for the mentoring of new teachers (i.e., those with less than three years of active experience) and requirements for ongoing professional development, but like so many things, these services are subject to the availability of LEA and school resources. The MDE Professional Preparation Services Unit does monitor compliance with these regulations but because the auditing process is enforced by a consultant assigned to this responsibility, our sense is that the auditing process is not rigorously enforced.

2.3.2 Target Environment

The certification process is largely self-funded through applicant fees. To better manage its resources and its plans for systems development, the MDE Professional Preparation Services Unit requires a system that models the volume of State certifications and re-certifications and hence projections of Unit revenues. This same tool set will allow the Unit to project education supply and demand needs by school based upon data (or a report) from the MDE Office Professional Preparation Services.

Such a system could assist the MDE Professional Preparation Services Unit in helping LEAs to address staffing shortages, especially in those areas requiring specialized skills.

Educator credentials are already available over the Web but this service will be expanded to accommodate online error correction and updates. Furthermore, the entire system requires more effective monitoring and reporting capabilities as well as the capacity for online application and payment processing.

Lastly, the certification process requires a better infrastructure for mentoring and induction so as to enable LEAs to provide mentor assignment and associated online professional development. The MDE will employ a "Teacher Quality Enhancement" grant to construct an infrastructure to provide online professional development, mentoring, and induction. Currently some of these services are hosted and available through the ASSIST Online modules of the Michigan Virtual University. These efforts will eventually lead to an extension of the Michigan Educator Talent Bank as part of a larger strategy for developing, recruiting, and retaining new educators with the right skills, especially in the areas of science and math.

2.3.3 Enabling Process Gap Analysis Table

The table below assesses, relative to the seven enabling processes in the DSAC model, where the MDE stands relative to its target environment for Certify Educators. The table employs a rating system that ranges from "0" to "3" to address the degree to which each of the enabling processes, identified in the DSAC framework, support the target environment. The rating for each element is as follows:

- A score of "0" means that the enabling process is completely inadequate for meeting the target environment.
- A score of "1" means that the enabling process is partially adequate for meeting the target environment.
- A score of "2" means that the enabling process is satisfactory for meeting the target environment.
- A score of "3" means that the enabling process has already reached the target environment.

Certify Educators		
Process	**Score**	**Status Relative to Target Environment**
Establish Policy	3	• Existing policies clearly define SEA and LEA roles and responsibilities. • Policies clearly align with NCLB. • LEA responsibilities in designating "highly qualified" teachers" is defined.
Provide Technical Assistance and Professional Development	2	• Both public and private institutions of higher education in Michigan offer pre-service and in-service programs that align with the MDE's definition of highly qualified teachers and administrators. These programs are reviewed by the MDE, and must be approved by the State Board in order to offer teacher certification courses. • MDE online professional services are provided to help teachers with the certification process. While certification can occur online, all course work is classroom based.
Publish Information and Provide Communications	2	• Paper process; largely left to the individual educator and his/her school administrator. • The MDE Website provides information on all aspects of certification and recertification.
Manage Core Process	2	• License 2000 has automated much of the certification process as it applied to Michigan degree programs; out-of-state programs still involve a paper-based application and data input process. • Teacher assistance with the "highly qualified" process occurs at the LEA level. SEA does provide regional workshops and a telephone help desk for technical assistance.
Provide Enhanced Decision Support	1	• Decision making largely rests with the LEA and is paper based. • The information systems enabling License 2000 and REP do not at present lend themselves to trend analysis and analytical modeling.

Certify Educators		
Process	**Score**	**Status Relative to Target Environment**
Provide Organization/Staffing	1	• Recruitment and retention are LEA responsibilities. • There is no real capacity of a MDE audit function to ensure compliance with State statues regarding certification and HQ status. This process is now under development.
Assess Funding Needs	1.5	• Funding is adequate to ensure ongoing operations of the existing program. • Funding is not in place should the State wish to incentivize recruitment and retention of educators in fields and subject specialization facing severe shortages, such as science and math.

2.3.4 Technology

The following describes the characteristics of the applications that support the certification of educators for Michigan:

Associated System	Score	Status Relative to Target Environment
License 2000	1.5	• Meets all basic needs, but should be integrated with REP and other systems. • Would benefit from analytical capabilities that could be provided outside the system through CEPI services.
REP	1.5	• Meets all basic needs, but should be integrated with License 2000 and other systems. • The system tracks the employment history of educators and staff within the State educational system and, as such, could serve as a system of record for tracking educator assignments among Michigan LEAs.
Michigan Virtual University and the Learning portal	3	• Best in class delivery of online, self-paced training as developed by Michigan's public university system, itself a best-in-class model of publicly funded higher education. • Offerings include a wide range of continuing education courses for educators and school administrators. • Credits are provided towards recertification and towards endorsements.

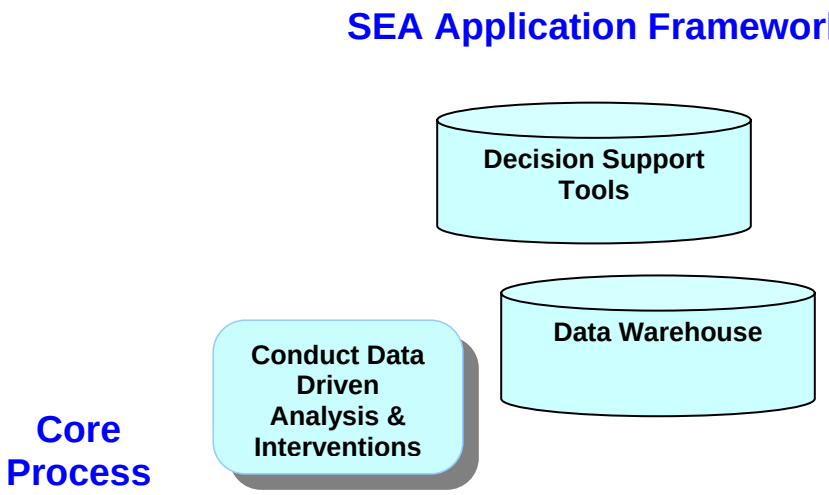
2.3.5 Recommendations

The following are the recommendations that are necessary to support movement from the current to the target environment.

1. Better integrate and secure educator and staff demographic, certification, endorsement, job assignment, and job history data. Within that service, require a "UIC" or PIC (some staff already have the PIC) for educators and staff as well as role-based authentication and permissions.
2. Track what teachers actually teach against where they work, their job history, and what they know (certificates and endorsements).
3. Map teacher assignments by school, by class, by student, and by student performance over time, employing said data locally to inform educator professional development planning.
4. Extend REP to accommodate educator electronic portfolios and the acceptance of electronic transcripts from institutions of higher education as the later become available.
5. Provide secure access via the e-portal to Certification records for the online correction of errors and other self-servicing features.
6. Enroll higher education university research centers in the more detailed analysis of the data that emerges from the expansion of License 2000 and REP and its integration through CEPI services with State MEAP and intervention data to inform policymaking, staff training and development programs, and the investment of State education dollars.
7. Integrate University e-transcripts for educators and staff into the envisioned License 2000 data repository and process once it is practical to do so by establishing a standard for the transmission of e-transcripts to the MDE as part of its Web-enabled certification process.
8. Align data in License 2000, REP, MEAP, and other programmatic data to inform individual educator performance assessments and professional development plans, once data is available, that links teachers to the student performance of those they teach.

2.4 Core Process 4: Conduct Data Driven Analysis and Interventions, and Manage Accountability Systems

Application Framework Component: Decision Support Tools and Data Warehouse – This is the process for collecting and analyzing assessment data to identify and conduct interventions at the school, classroom, and student level. This process also includes defining expected performance levels for districts, schools, and teachers, and holding them accountable for achieving these levels, with appropriate rewards for success and as such draws on other SEA/LEA data, such as financial, personnel, educator, and school data, drawn from the SEA's data warehouse.



2.4.1 Current State

As part of a series of major MDE reorganizations, the Department has recently established a School Improvement Unit whose responsibilities encompass statewide K-12 standards, curriculum frameworks and benchmarks; oversight of MDE interventions among schools at risk; and MDE support of LEA AYP planning and reporting processes. Though the current organizational context of MDE responsibilities in these areas is new, the underlying processes are well established. In Section 2.1 of the report, we have previously reviewed the standards components of the MDE School Improvement Unit. Here we will consider the data driven analysis and intervention aspects of the Unit's mandate.

Well-defined State regulations mandate a process that guides all MDE interventions, including proper access to and use of student data. Accountability for performance is held at the LEA and not the SEA level.

The MDE Educational Assessment and Accountability Unit oversees the State high stakes test (MEAP), leaving the MDE School Improvement Unit with the responsibility for the school intervention process itself. The Michigan Legislature and not MDE actually provides intervention awards at the school level, but not at the individual teacher level, for school actions taken and progress made against AYP plans. For each LEA, student MEAP assessment data is made available through a downloadable file via the MDE secure portal and a computer program (TestWiz) is made available at no cost to analyze the student performance data.

Each school completes a report card per MDE specifications as to its progress against its particular AYP plan. The MDE School Improvement Unit provides support and direction to LEAs as they address the AYP process and also offers programs through the Michigan Virtual University and its Learning Portal to supplement these efforts.

There is no database structure to examine performance data longitudinally across the State by school and LEA. On the other hand, there is a well-established process for intervention support once a school is identified as not meeting its AYP Plan goals. MDE currently offers an automated AYP planning tool, "MiPlan." MDE is looking at a variety of options for enhancing the school improvement planning process and providing an upgraded school improvement tool. In brief, the information technology systems and human resources available at the MDE level to assist Michigan LEAs and schools at risk are very limited, a situation that the new School Improvement Unit would like to remedy. MDE provides MI-Map, a paper-based tool kit and process guide for school improvement.

2.4.2 Target Environment

The MDE School Improvement Unit and its Office of Interventions would like to take a portfolio approach in its offerings to LEAs and schools, employing decision support capabilities to highlight common areas of need and the interventions that yield the best results. To this end, the Unit requires an accessible database of student, teacher, and financial performance data. The data warehousing solution discussed elsewhere in this report would enable this capability by capturing and aggregating time-stamped data concerning student performance, educator quality, resources, and the like; and then providing tools for the analysis and display of this processed information. The data warehouse would also serve as the backend to any move towards "value-added" analysis of student learning, education programs, et al.

At the same time, many LEAs could use an automated AYP Planning process tool that integrates with MEAP, MI-Access and ESL assessment output and that readily identifies where each school in their district stands vis-à-vis State and Federal performance standards. Such a tool would also facilitate the proactive planning of improvements at the school level, raising the overall level of school performance without recourse to the limited people resources and interventions available through the MDE. From a reporting and compliance standpoint, this same tool set could roll up information to the district and State level for decision-making, program participation, and accreditation.

2.4.3 Enabling Process Gap Analysis Table

The table below assesses, relative to the seven enabling processes in the DSAC model, where the MDE stands relative to its target environment for Conduct Data Analysis, Interventions/Accountability. The table employs a rating system that ranges from "0" to "3" to address the degree to which each of the enabling processes, identified in the DSAC framework, support the target environment. The rating for each element is as follows:

- A score of "0" means that the enabling process is completely inadequate for meeting the target environment.
- A score of "1" means that the enabling process is partially adequate for meeting the target environment.
- A score of "2" means that the enabling process is satisfactory for meeting the target environment.
- A score of "3" means that the enabling process has already reached the target environment.

Conduct Data Analysis, Interventions/Accountability		
Process	**Score**	**Status Relative to Target Environment**
Establish Policy	2	• Current legislation clearly defines the roles and responsibilities of all parties involved in the intervention process and appear to satisfy the needs of all stakeholders.
Provide Technical Assistance and Professional Development	2	• While some services exist, these are focused on the schools of greatest need and are limited in terms of their scope and subject matter focus. • The SEA does avail itself of online, Web-based services – both through the MDE and the Michigan Virtual University to assist those schools in need.

Conduct Data Analysis, Interventions/Accountability		
Process	**Score**	**Status Relative to Target Environment**
Publish Information and Provide Communications	1.5	• The interventions process is driven by annual MEAP results as aggregated at the LEA and school level and as shared with LEAs and schools through the established mechanisms cited in Section 2.2 of this report.
Manage Core Process	1.5	• Only the weakest performing schools are serviced at present. • There are few to no services for those schools that operate at a level slightly above the bottom tier. • Formative/interim testing processes are not employed at this time.
Provide Enhanced Decision Support	1	• The TestWiz tool has limited utility and its implementation as a service is suboptimal. • Little support and no other database or analytical services and tools are provided to LEA. • Performance data is not employed to inform educator performance nor does it influence educator pay. • The MDE does not currently provide automated AYP planning tools.
Provide Organization and Staffing	0	• The interventions team appears to be understaffed and clearly without the resources, systems, and services to expand its positive impact across Michigan LEAs. • LEAs receive data, but the MDE has no means to determine what they do with it other than through observing subsequent school performance measures against AYP targets.
Assess Funding Needs	0	• The MDE has very limited resources for interventions. Those resources that are available come directly from the State legislation.

2.4.4 Technology

The following describes the characteristics of the applications that support data analysis and interventions for Michigan:

Associated System	Score	Status Relative to Target Environment
Assessments Analysis Tool	1	• TestWiz – compiles, sorts categorizes test data; provided to LEA's with Assessment data sets. • The product is proprietary and difficult to use for some. Limited training and support provided by the MDE to the LEAs. TestWiz is particularly weak in its ability to display data, especially graphically. This tool needs to be replaced with either a service or tool set that allows for more complete integration with other student and school data via a data warehousing solution to enable assessment-driven decision support.
AYP Planning	0	• The MDE should provide a common online data-driven AYP Planning Tool for all LEAs that would in turn assist the MDE in focusing its limited resources while also enabling the schools, their LEAs and possibly their ISDs to provide proactive intervention services to those schools in greatest need.
"Value-Added" Determinations	0	• No system is currently in place. The MDE should pursue this new service offering as resources and time allow.

2.4.5 Recommendations

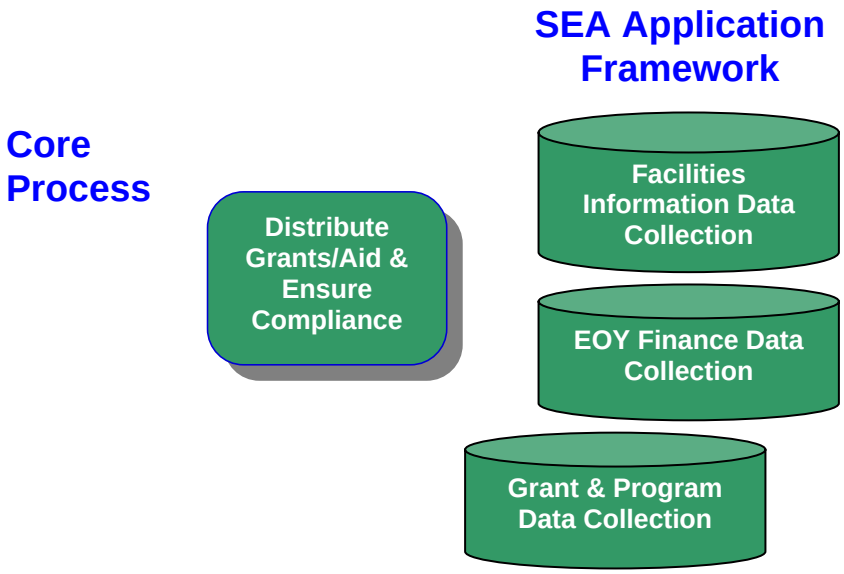
The following are the recommendations to move from the current to the target environment:

1. Provide an AYP process tool set for LEA use that enables current school-specific assessment as well as district and State benchmarks that rolls up AYP findings to the LEA and to the SEA level. Tools should integrate with the data warehouse, using presentation of data and automation to guide effective decision-making. Here again the DSAC team sees an opportunity to leverage e-portal services.
2. Deploy formative (interim) assessment services as a data-driven, proactive service offering to enable LEA action prior to the high stakes measurement cycle, enabling data-driven, proactive interventions by the schools and LEAs themselves.
3. Track the development and implementation of school improvement plans, highlighting best LEA practices as to what interventions yielded what improvements.

4. Create scaled services for school and district administrators with more self-directed, automated tools that help identify and direct improvements based upon performance trending data.
5. Enable LEA and school staffs to proactively address data-informed performance issues before these issues necessitate intervention by the MDE though Web-based training in performance data analysis and interventions best practices.
6. Employ the envisioned CEPI data warehouse to generate separate "data marts" or customized subsets of data for each of Michigan's 826 LEAs.
7. Provide a user-friendly tool set in conjunction with the CEPI data warehouse and the LEA data marts for end user self-directed querying and ad hoc reporting, freeing MDE personnel for more high-value contributions.
8. Provide a decision support tool set to assist the Interventions team in focusing their resources in servicing schools and resources.
9. Leverage these capabilities to address the data-driven decision-making, reporting, and data tracking needs for post secondary educational services and State job training programs per the recommendations of the Cherry Commission.

2.5 Core Process 5: Distribute Grants/Aid and Ensure Compliance

Application Framework Components: Facilities Information Data Collection, EOY Finance Data Collection, Grant, and Program Data Collection. This is the process for collecting data and distributing funding to school districts either as direct State aid or through State or Federal grants. Grants may be either competitive or based on entitlement formulas. This process also ensures compliance with Federal and State requirements (such as Title I compliance).



2.5.1 Current State

MDE has two offices, each with their own systems and processes, coordinating Core Process 5: Distribute Grants/Aid and Ensure Compliance:

- Grant Coordination and School Support (GCSS) facilitates Federal and some State (Michigan School Readiness Program, Section 31a Program Report and Section 31a/32e Flexibility and Section 57.1/57.3 Advanced and Accelerated) funded grants. GCSS uses the Michigan Electronic Grants System (MEGS), supporting various program offices in MDE and other State agencies. In addition, child nutrition programs are managed with separate systems.
- School Aid and School Finance employs the State Aid Management System (SAMS) for the management of other State grants.

Program Offices determine allocations and GCSS assists with Superintendent approval. The State Aid System is a separate office and system. In both cases, allocation formulas are based on federal or state legislation. This family of services includes federal entitlements, such as vocational education, Title 1, and special education funding. Separately, the Office of School Aid and Finance administers aid funding to Michigan schools, from such appropriations as the State School Aid Act, and the Child Nutrition Application Program.

Though many Federal and State grants data are maintained on the Michigan Electronic Grants Systems (MEGS), some State grants processes remain paper based. The CEPI Single Record Student Database (SRSD) help define ISD, LEA and individual school eligibility for grants based student census data and governing regulations. With this information in hand, the MDE Grants Coordination and School Support Unit manages disbursements and payments. Most grant processes and allocation formulas are defined rigorously at the State or Federal level and communicated to the ISDs, LEAs, and schools both via MDE Websites and State and Federal publications. Video conferencing, special semi-annual conferences, a monthly newsletter and special focused announcement (e.g. for charter school grants) are employed to supplement these efforts.

For its part, the Office of State Aid and School Finance employs its own State Aid Management System (SAMS) and not MEGS for the management of its data. SAMS does download aggregate data from CEPI but it does not use nor has use for any student data and therefore does not use UIC.

The rules of accountability tend to be program specific and are overseen by the appropriate program area as well as through the Grants Coordination and School Support Unit and the Office of State Aid and School Finance. Where appropriate and necessary, some grants (mostly Federal) may be applied for by ISDs, LEAs, and schools online through MEGS while others (most State grants) require a paper applications and manual workflow process. Typically, distributions occur in a timely manner and little to no unused funds are ever returned to the Federal government. Both the MDE and other State agencies audit LEA and school grant distributions to ensure compliance with allocation formulas, eligibility definitions, and other grant requirements.

In terms of data management, the Grants Coordination and School Support Unit asks districts for aggregate student data and does not collect individual student data. They do not employ CEPI as their source of student data but do draw some data from a variety of sources such as SCM, SRSD. GCSS does not use or need the UIC because they do not at present capture/use individual student information. Instead they use a

truncated version of the unique school identifier from the School Identification Database which may cause problems eventually as school ID numbers exceed the truncated allotment in MEGS but only perhaps in a claims system for Food and Nutrition (outside MEGS). They are currently working on the fix.

2.5.2 Target Environment

In the best of all worlds, the MEGS grants management system would track all aspects of the grant process, from the ISD/LEA/school application process to final audits, and would provide management and compliance reporting capabilities in line with Federal, *NCLB*, *IDEA*, and Michigan State standards. For its part SAMS could stand-alone or could be integrated with MEGS in some manner to provide a holistic view of school and LEA funding sources. Under the envisioned CEPI data-driven decision-making capability, grants/aid data could be integrated with student performance data, et al., allowing educators to better understand the relationship between grants and aid funding and student performance improvement.

As an outcome of this integration effort, the MDE team would find itself in a better position to understand the relationship between grants/aid funding and school and student performance. It is also likely that the Office of State Aid and School Finance would benefit further from this arrangement and its partnership with CEPI. In the end, this arrangement will assist the MDE to better target future discretionary funding in line with the greatest needs of the LEAs and their schools.

Through Web-services automation, the Grants Coordination and School Support Unit could transform its function to provide another dimension to the process of funds allocation based upon an alignment of funding with performance improvement as well as with those process driven by formulaic driven legislation. This mechanism should help all ISDs and LEAs but especially the State's smaller districts as well as to ensure that Michigan obtains and retains all of the grants funding to which its schools and students are entitled.

2.5.3 Enabling Process Gap Analysis Table

The table below assesses, relative to the seven enabling processes in the DSAC model, where the MDE stands relative to its target environment for Distribute Grants/Aid and Ensure Compliance. The table employs a rating system that ranges from "0" to "3" to address the degree to which each of the enabling processes, identified in the DSAC framework, support the target environment. The rating for each element is as follows:

- A score of "0" means that the enabling process is completely inadequate for meeting the target environment.
- A score of "1" means that the enabling process is partially adequate for meeting the target environment.
- A score of "2" means that the enabling process is satisfactory for meeting the target environment.
- A score of "3" means that the enabling process has already reached the target environment.

Distribute Grants/Aid and Ensure Compliance		
Process	**Score**	**Status Relative to Target Environment**
Establish Policy	2	• There are clear policies and procedures in place that are uniformly enforced across the State concerning the allocation of funds/grants to LEAs and schools.
Provide Technical Assistance and Professional Development	2	• The MDE Grants Coordination and School Support Unit and the Office of State Aid and School Finance provide a wide range of mechanisms that engage ISDs, LEAs, and schools in its grant/aid awards and distribution services.
Publish Information and Provide Communications	2	• The grants/aid process is well publicized through the MDE Website, conferences, publications, and other media events.
Manage Core Process	1	• The underlying processes within the Grants Coordination and School Support Unit are somewhat siloed. For example, the Grants process takes on a series of different workflows depending upon the granting agency and the nature of the grant. All in all, the processes are labor intensive, redundant from the LEAs point of view, and do not always make the best use of limited MDE resources. • MEGS has reduced labor and redundancy, and the GCSS planning processes focus resources and improvements upon top priorities. • Reporting cycles for MEGS are at variance with those for the SRSD system. This barrier is easily resolved to accommodate data sharing and the streamlining of system operations and support.

Distribute Grants/Aid and Ensure Compliance		
Process	**Score**	**Status Relative to Target Environment**
Provide Enhanced Decision Support	1	• The data management tools and online processes available within the Office of State Aid and School Finance and the Grants Coordination and School Support Unit are limited and do not offer a platform to achieve the Unit's long-term vision.
Provide Organization and Staffing	1.5	• See the statement on "manage core processes" above. • There is insufficient resource given to the audit and review function.
Assess Funding Needs	1	• Funding of service is adequate for the range of services now in place but the department requires added resources if it is to provide expand, data-driven, Web-based, service delivery. • Or it could partner more strongly with CEPI and DIT to achieve the desired decision-support enabled outcomes.

2.5.4 Technology

The following describes the characteristics of the applications that support grant management for Michigan:

Associated System	Score	Status Relative to Target Environment
Michigan Electronic Grants System (MEGS)	1	• The grants distribution process is managed using either paper processes or MEGS. The latter does obtain nightly updates of data from the SCM and annual update from SRSD on *Gun_free Reporting*. But these processes do not optimize the data collection/management processes within their respective functions. MEGS does not employ the UIC as a core linking data element. In addition, MEGS does not collect data at the individual student level so that it can be rolled up for analysis. While none of this may matter today, these limitations will have an impact in terms of the State's ability to create a DSS that correlates student performance with a variety of environmental factors, including funding.

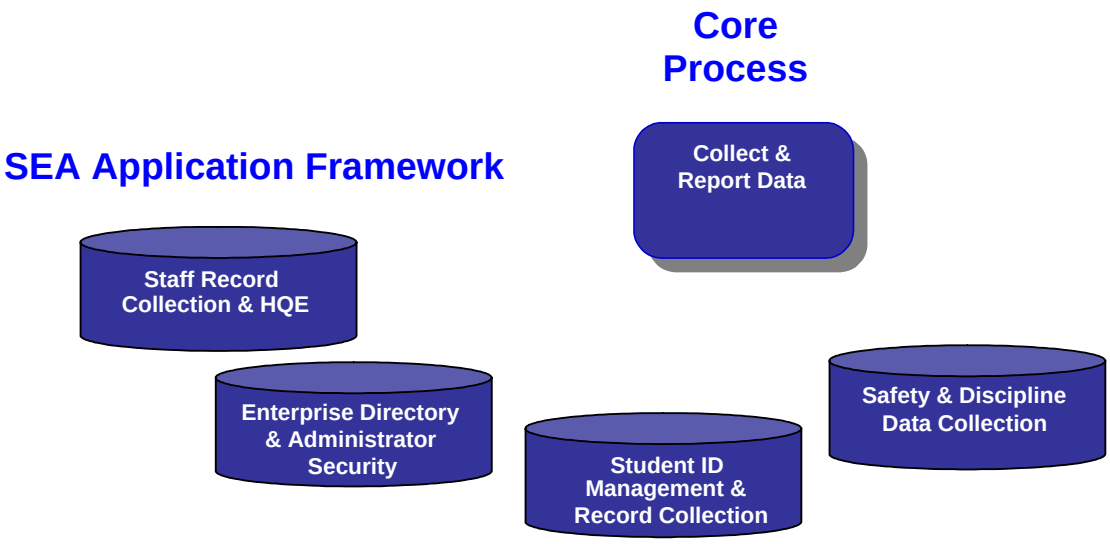
Associated System	Score	Status Relative to Target Environment
Michigan Electronic Grants System (MEGS) – cont'd	1	• This is not a system where the numbers are auditable; one needs to return to the LEAs for verification of data. • From a technical standpoint, MEGS – which is built on SQL 2000 and Microsoft Active Server Pages – appears to be flexible enough for greater collaboration and data/resource sharing between MEGS and SRSD.

2.5.5 Recommendations

1. Streamline and rationalize existing processes and workflows, resulting in a single management system and the elimination of multiple, redundant data entry work from the LEA perspective.
2. To that end, integrate the grants data collection process with CEPI's data services to eliminate redundant data capture.
3. Similarly, employ a single e-grant system to manage both State and Federal grants, affording access to current and historical financial information pertaining SEA and LEA's grants in line with school and student performance.
4. If necessary, obtain a new e-Grants system, potentially adapting the software developed and successfully deployed by a fellow member of the DSAC consortium. Consider partnering with other DSAC member States in modeling and developing an integrated grants/aid system solution.
5. Gather data on grants and other funding sources within the envisioned data-warehousing environment to analyze the effectiveness of current investment strategies and to redirect resources in an informed manner. Employ these CEPI-based services to better manage the Grants Coordination and School Support Unit and to fulfill its mandate.
6. Make grant and financial data part of the overall MDE data model and eventually make them available for analytical purposes (beyond aggregate level funding information) in the data warehouse along with student related data to inform school, district, and State decision making.
7. As part of a long-term data management strategy, the State should assess the merits of managing both grants and aid funding through a single information system that looks to SRSD for its student information but then adds in all of the necessary functionality to manage grants and aid application, distribution, and auditing processes.

2.6 Core Process 6: Collect and Report Data

Application Framework Components: Enterprise Directory and Administrator Security, Student ID Management and Record Collection, Safety, and Discipline Data Collection. This is the process for collecting student, educator, and program/organization data from school districts relative to all aspects of educational program information.



2.6.1 Current Environment

With the fairly recent establishment of CEPI, the State of Michigan has formed a single authority for the collection, management, and servicing of educational data. Given the size of Michigan's student and education/staff populations, the complexity of the local and State organizational framework within which services are provided, and the Legislature's mandate to embrace pre-K through 20 educational programs within a single, data-driven decision support system, CEPI has much to accomplish.

In its brief history, CEPI has proceeded with the institutionalization of a unique student identifier (the UIC) across those constituencies serviced by MDE (i.e., K-12) and an operational data store (ODS) for enterprise student data (again K-12). The CCSSO Decision Support Architecture Consortium (DSAC) would characterize these activities as foundational to the construction of a complete and comprehensive decision support solution of Michigan educational data. To achieve these ends, the CEPI

team has partnered on the one hand with DIT for technical resources and support and on the other hand with the various operating units of the MDE and the State's LEAs and ISDs for source system data.

In the view of the DSAC team, the current accomplishments of CEPI in these regards are substantive and substantial. However, both CEPI and its partners are seriously under-resourced to realize their ultimate goal, a decision support system that encompasses the instructional management and learning experience needs of the States pre-K-20 student population. While the current interagency model may work, it will only deliver partial solutions unless all of those agencies who own systems of record join in and play by the same game plan and rules. For example, all State student information systems must adopt the UIC as the key linking record for individual (student, educator, and staff) identities. A master plan for data feeds and data outputs is required to marry with the operational needs of the agencies and operating units served by CEPI's decision support services. This plan needs to encompass MDE, DLEG, OMB, the State college and University system, and other key stakeholders. For that matter, a process is required whereby executive level policy on data and the operational stewardship of data management and quality control are coordinated for the State as a whole.

CEPI has made good progress towards the desired end state. No single unit of State government holds the answers. Instead, the governance and ongoing management of this effort must be built upon a collaborative model where roles and responsibilities are clearly defined and where each player does his/her part to support a Statewide solution. Furthermore, it is unlikely that CEPI, DIT, or any other Michigan agency has sufficient expertise to get the job done. It is the hope of the DSAC team, that the Michigan decision support systems effort will leverage the knowledge an expertise of the Consortium and the best practices and even the systems of sister States as it proceeds with its important work.

2.6.2 Target Environment

The establishment of the envisioned data-driven decision support system for the State of Michigan pre-K to 20 education community will require many different layers of effort. First and foremost, under the aegis of CEPI, the State requires a master data management plan that considers source systems, data elements and their definitions, business rules, workflows, and reporting requirements, and an information technology architecture that defines the technical layers of the decision support system solution. Next, CEPI will need to work in close coordination with a governance structure that will in turn enforce and enable the data management plan as well as address issues that rise during its implementation.

DSS process governance occurs at three levels:

- *Strategic level* – through a *Data Policy Committee* comprised of the agency's executive management team, DIT representatives, and perhaps representative ISD and LEA members, to define the requirements and levels of performance for the DSS, to address matters of data policy and to resolve process issues that divide the *Data Managers Working Group.*
- *Tactical level* – through a *Data Managers Working Group* comprised of those parties primarily responsible for the agency's *systems of record* (a.k.a. *source systems*), including the student information, assessment, certification, financial, human resources, and other systems, and appropriate DIT representatives to identify and work with the *Data Management Project Team* on the detailed design, features and services of the DSS, to define data standards and data management best practices for the agency as a whole, to address issues associated with data standardization and management, and to escalate as needed issues to the *Data Policy Committee.*
- *Operational level* – through a *Data Management Project Team* comprised of both agency operational process and technical data management experts, including from within DIT to build the repositories for both *metadata* and data, to construct the mechanisms for data extraction, transformation and integration, to oversee data collection, clean-up and transformation, to design and initiate the agency's DSS services, tools and reporting mechanisms that in turn leverage the agency's new data management platform, and to provide training and support during the start-up and transition phases of the agency's DSS offering.

The aforementioned steps are essential to the ultimate realization of a DSS solution for the State of Michigan.

With these plans and structures in place, CEPI and its partners will construct all the necessary components of a decision support system and related processes, including:

- Establishing and staffing a project team.
- Building a comprehensive metadata directory for all of the data elements to be associated with the pre-K to 20 data warehouse, including data definitions and associated business rules and valid values.
- Building a relational data model that accommodates all the data as defined in the metadata directory

- Extending the operational data store (ODS) as the staging area for source system data.
- Constructing a system for data validation and data-clean-up within source systems.
- Extracting transforming, and loading data from source systems into the ODS.
- Constructing a data warehouse (a.k.a. analytical data store) and its associated business rules to capture and store "frozen" sets of data at prescribed cycle times.
- Develop data marts, query tools, and standard reports in support of end user requirements.
- Provide end user training and support for DSS services.

The key to all of this work is to first reach a general agreement to and commitment from key stakeholders for the overall data management strategy and then to build an incremental approach into rollout of DSS services, beginning with a "kernel" of key student data drawn from a limited number of source systems and then growing this base. Given the scope of the State's DSS aspirations, the phasing of work is essential for a positive outcome.

2.6.3 Enabling Process Gap Analysis Table

The table below assesses, relative to the seven enabling processes in the DSAC model, where the MDE stands relative to its target environment for Collect and Report Data. The table employs a rating system that ranges from "0" to "3" to address the degree to which each of the enabling processes, identified in the DSAC framework, support the target environment. The rating for each element is as follows:

- A score of "0" means that the enabling process is completely inadequate for meeting the target environment.
- A score of "1" means that the enabling process is partially adequate for meeting the target environment.
- A score of "2" means that the enabling process is satisfactory for meeting the target environment.
- A score of "3" means that the enabling process has already Collect and Report Data reached the target environment.

Collect and Report Data		
Process	**Score**	**Status Relative to Target Environment**
Establish Policy	2	• The policies in place to govern and enable data collection, security, and confidentiality meet all local, State and Federal requirements.
Provide Technical Assistance and Professional Development	2	• CEPI and the MDE provide an adequate amount of Web-based information and online training about data collection, processes, and services, mostly pertaining to SRSD functionality. • The DIT Client Service Center provides additional support.
Publish Information and Provide Communications	2	• The MDE and CEPI employ both public and intranet Websites to promote effective data collection processes and quality data collection. This service adequately meets current needs especially when supplemented by IS and IT help desk services.
Manage Core Process	2	• For the collection and consolidation of student information, the SRSD has all the necessary process components in place, albeit that some of these processes for data collection can be cumbersome and occasionally error-prone for the LEAs. • No integrative data collection process is in place for some aspects of staff, and grants, facilities, and financial resource data.
Provide Enhanced Decision Support	1	• Most essential reporting for NCLB and IDEA is achievable through existing systems, but with a considerable amount of effort both at the LEA and SEA level. • More sophisticated, longitudinal analysis will require an investment in data integration services, data warehousing, and data marts, especially if these services are to inform decision making at the LEA and school level.
Provide Organization and Staffing	1	• The partnership of MDE, DIT, and CEPI is understaffed for the challenge. At the same time there is redundancy among the various MDE and CEPI data collection and processing services. • To achieve their goals and objectives in light of NCLB and in their effort to better serve the LEAs, the MDE needs to realign its resources around comprehensive data warehousing and analytical services.

Collect and Report Data		
Process	**Score**	**Status Relative to Target Environment**
Provide Organization and Staffing (cont'd)		• MDE, DIT, and CEPI will require further training and development to meet this objective.
Assess Funding Needs	0	• At present the funding is not in place to both implement the envisioned decision support systems and to maintain the associated ongoing services. • The automated solutions identified in this study should result in the enhanced productivity and effectiveness of existing MDE personnel, allowing the Agency to take on some of their new decision support roles and responsibilities without a corresponding increase in staff.

2.6.4 Technology

The following describes the characteristics of the applications that support the collection of data for Michigan.

Associated System	Score	Status Relative to Target Environment
Data Warehouse	0	• No services in place.
Decision Support Tools	0	• No services in place.
Enterprise Directory Services	0	• No services in place.
Student ID and Information Systems – the Unique Identification Code (UIC)	2	• CEPI maintains a statewide unique identifier system for all students, employing a standard personal demographics matching algorithm to ensure uniqueness. Unfortunately, the system has not been adopted by all agency users for their data systems, and suffers from some matching algorithm problems. • CEPI also maintains a statewide student information management system (SRSD) for the operational management of student data and for the linking of student demographic information with assessment and other student specific data. Each LEA must comply with a data transfer format established by CEPI.

Associated System	Score	Status Relative to Target Environment
Student ID and Information Systems (cont'd)	2	• SRSD must be collected more frequently (ongoing basis) to support various CEPI customer needs. SRSD must also become the standard among agencies for the single, shared source of core student demographic data. • SRSD is an excellent operational data store built on the State's standard DB platform, Microsoft SQL. The platform has the capability to serve as a data warehousing, storing, tracking, and correlating longitudinal data. However, the system is not designed for this purpose. Over time, the existing design will become a serious barrier to information management and decision support. There is great benefit and utility in leaving SRSD as an operational data store for student information and creating, along side SRSD, a data warehouse for the long-term storage and manipulation of State educational data.
Special Education Data Collection	2	• Special Education (SPED) data is collected and processed through MICIS, a system owned by the MDE but managed and supported by IIS. The system meets many of the immediate needs of the SPED Unit but still lacks a number of key fields. • SPED has its own unique student identification system • CEPI's SRSD database is expanding to both encompass more SPED data fields and the December collection of SDEP data. • Reporting cycles within the SPED process have led the Office to maintain separate systems for reporting. This may no longer prove necessary once the CEPI's operational and analytical data store services are fully in place. However, SPED like most MDE programs will need to retain its own transactions systems to enable day-to-day SPED operations.
Safety and Discipline Information Collection - School Infrastructure Database (SID)	2	• Another best in class application. • Each and every State educational property is listed with its own unique ID number (a.k.a. School Code Master Number), but needs to hold historical data in order to be useful for longitudinal analysis.

Associated System	Score	Status Relative to Target Environment
Safety and Discipline Information Collection - School Infrastructure Database (SID) – cont'd	2	• The system captures crime and safety data, facilities data, and related management information. SID is current for K-12 data only.
Staff Record Collection and Highly Qualified Determination	2	• The system tracks the employment history of educators and staff within the State educational system and, as such, could serve as a system of record for tracking educator assignments among Michigan LEAs. • The "HQ" categorization is a "yes/no" field with no detail but could be extended to provide more useful source data. • Also need to standardize on the unique staff identifier, to be consistent or the same as the UIC.
End of Year Finance Data – the Financial Information Database (FID) and the Michigan Administrative Information Network (MAIN)	3 (for FID) 2 (for MAIN)	• FID is a new service of CEPI that captures all key year-end financial data. This product, as maintained by DIT, is made from industrial strength technologies and will integrate well with other data services envisioned by CEPI. • The service will also run within an e-portal framework once that service comes online. FID will serve as a key contributing element to the statewide education decision support system. • The MAIN system is State owned and run. It maintains MDE and other agency financial data, budgets, etc. It can produce feeds as necessary for any CEPI decision support solution.
Facilities Plan Data Collection – School Infrastructure Database (SID)	3	• Another best in class application. • Each and every State educational property is listed with its own unique ID number (a.k.a. School Code Master Number). • The system captures crime and safety data, facilities data, and related management information. SID is current for K-12 data only.
Technology Plan Data Collection	1	• Need to collect data around information technology readiness of schools (see www.techplan.org). • Ed Tech Plans submitted via MEGS by LEA, reviewed by ISD teams.

2.6.5 Recommendations

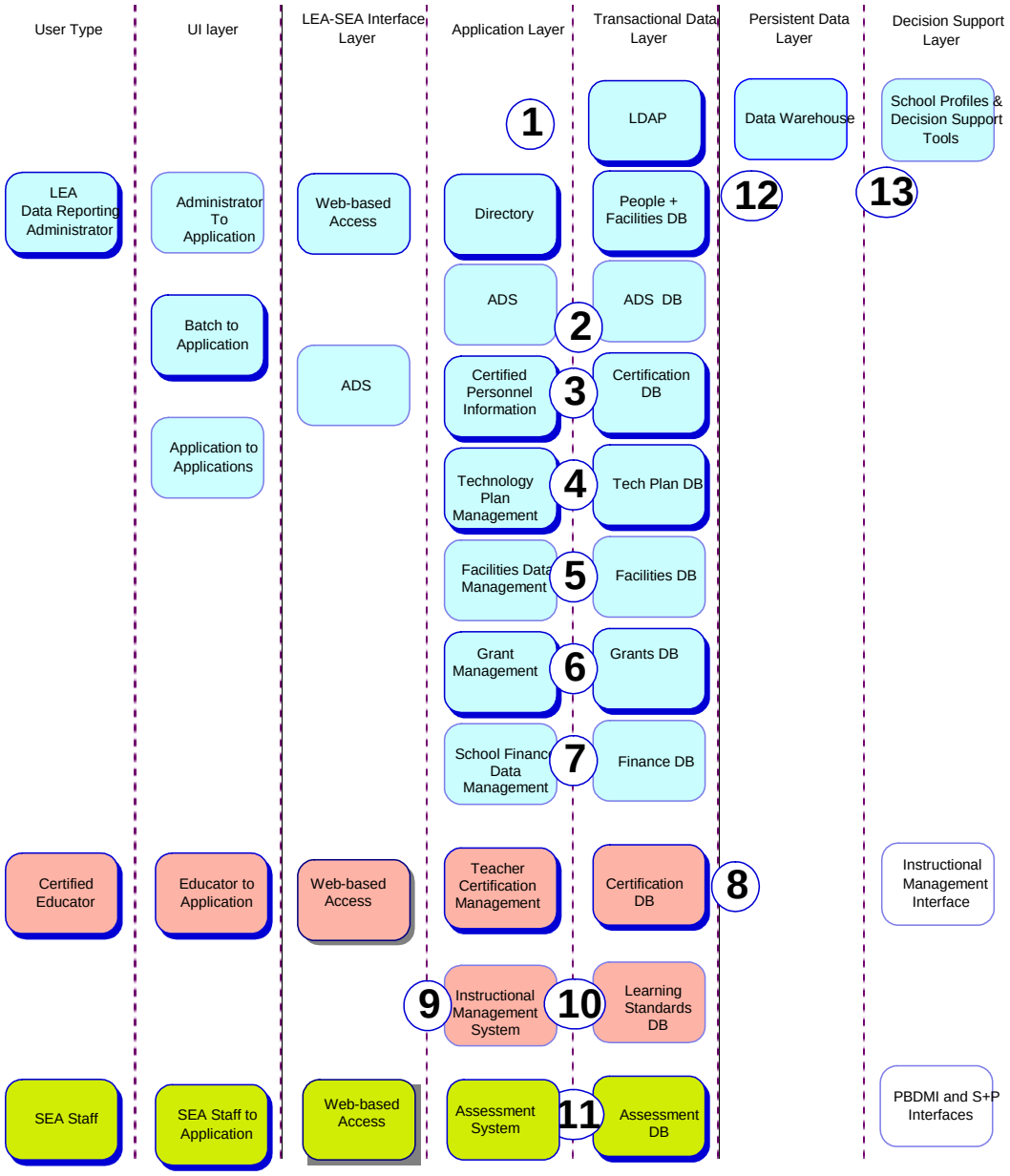
1. Through CEPI, deliver the data warehousing and data mart services platform required by State agencies and the LEAs.
2. In conjunction with this data management platform, provide an extensive but easy-to-use interface that will deliver to educational process stakeholders' information on a 24x7 basis via the Web through querying capabilities and more formal reporting.
3. To access these and other aforementioned Web services, establish a security and access control service based on both unique user authentication and the alignment of the UIC with specific system roles and permissions.
4. For owners of source data, data cleanup must become a priority. CEPI should provide assistance, direction, and support to these efforts as well as introduce an automated data clean-up processes.
5. Decision Support Systems (DSS) governance needs to quantify the ongoing benefits of its DSS solutions in terms of labor savings, staff redeployment, data quality, and enhanced data access usability at the State Agency and LEA levels.
6. Extend and strengthen State's directory services to provide unique identifiers for educators and other staff similar to the service already in place for unique student identifiers.
7. As part of the strategy, leverage these directory services as a secure platform for data collection and exchange, analysis and reporting. To that end, the State will also need to extend its investment in role-based and ID-based authentication and permission administration beyond that already in place so as to provide automated and secure access for these offerings to school administrators and educators throughout Michigan, and to provide more robust, yet secure Web-enabled data management services that enable decision support.
8. Leverage these capabilities to address the data-driven decision-making, reporting, and data tracking needs for post secondary educational services and State job training programs per the recommendations of the Cherry Commission.

Note: While this model has particular application to the data management needs of K-12 and hence the focus of the MDE, these constructs, observations, and recommendations also apply to the post-secondary education data management needs of the State. It is the recommendation of the DSAC study team that Michigan first focus on the work to delivery on *NCLB* and *IDEA* mandated data services and then move beyond this mandate to address pre-K and post-secondary data management needs.

3.0 Information Architecture

3.1 Composite View of the Information Architecture

Below, the reader will find a composite view of the DSAC team recommended information architecture for the MDE, shown by architecture layer.



3.2 Comprehensive Technology Assessment

The diagram above gives a logical depiction of the systems that are required for effective decision support focused on improving student achievement. The diagram shows the layers of systems services, including: end user presentation, decision support applications, underlying transaction processing, and the permanent data store. For the purpose of this discussion, the observations and recommendations concerning the systems numbered above fall into two actionable categories: (1) core applications (meaning they should be implemented first and are the building blocks of other applications) and (2) service applications – which use core applications as part of the building blocks and deliver decision support functionality to district, school or MDE personnel.

Note: While this model has particular application to the data management needs of K-12 and hence the focus of the MDE, these constructs, observations, and recommendations also apply to the post-secondary education data management needs of the State. It is the recommendation of the DSAC study team that Michigan first focus on the work to delivery on *NCLB* and *IDEA* mandated data services and then move beyond this mandate to address pre-K and post-secondary data management needs.

1. **Directory –** The directory is a core application. Applications use this to allow user authentication, single sign-on, security authorization, generation of distribution lists, etc.

   Observations: The existing Michigan Education Information System (MEIS) provides common user identification used by many MDE applications, and may provide a starting point.

   Recommendations: The State must invest in a suitable directory service.

2. **Student ID and Record Collection** – This is another core application. The demographics data, attendance data, and schedule information feed a number of other important systems.

   Observations: CEPI has implemented a robust system for assigning student Ids and collecting student level data three times a year (which is not sufficient to meet all program needs). Currently all LEAs provide data to the system.

   Recommendations: All State agencies and organizations that work with student information must employ the UIC and should look to CEPI as the authoritative, centralizing source of consolidated K-12 student information. The United Stated Department of Education is about to call upon all SEA's to adopt SIF. DSAC urges Michigan to adopt the SIF standard for the sharing of student information across its agencies and services.

3. **Staff Record Collection Information –** This is a service application to collect individual records linked to the State certification system for both licensed and unlicensed educators. Either a flat file transfer to a relational database system, a SIF interface, or a Web-enabled data entry capability for districts that do not already have this information in electronic format should be provided.

   Observations: Good recordkeeping practices are in place and a fairly robust body of information is available. However, this service needs to adopt the UIC process for educators and staff and requires a Web interface for end-user/supervisor record clean-up and maintenance.

   Recommendation: The United Stated Department of Education is about to call upon all SEA's to adopt SIF. DSAC urges Michigan to adopt the SIF standard for the sharing of personnel information across its agencies and services.

4. **Technology Plan** – This is a service application. It should contain key information regarding technology infrastructure at the districts and schools that allow the State to determine whether appropriate infrastructure exists for deployment of certain systems (such as online testing). Either a flat file transfer to an asset management system, a SIF interface, or a Web-enabled data entry capability for districts that do not already have this information in electronic format should be provided.

   Observations: In general this role resides with the LEAs. The State plays no role in local information technology planning. However the School Information Database (SID) might be expanded to include essential information in this area. MDE provides policy for this process and does capture the current in MEGS.

   Recommendation: As part of the statewide roll out of data-driven decision support services, schools and districts will require a certain level of IT enablement. At the very least, the State will need to articulate and monitor local compliance with the minimum standards associated with the envisioned DSS services.

5. **Facilities Data Management** – This is a service application. It should contain key information regarding school and district physical facilities. Many states require districts to report information related to facilities. Either a flat file transfer to a relational database system, a SIF interface, or a Web-enabled data entry capability for districts that do not already have this information in electronic format should be provided.

   Observations: The SID system may be best-in-class. However, its usefulness is limited in that pre-K and post-12 educational systems do not use it for recording facilities, safety, and discipline information.

Recommendation: Enforce the universal use of SID by educational agencies and services within the State.

6. **Grant Management Software** – This is a service application that should provide online, Web-based grant posting, application submittal, and application approval, tracking and reporting using a workflow tool. The purpose of the tool is to expedite grant approval and improve grant monitoring and compliance. It should also be used to ensure that no federal funds have to be returned at the end of the fiscal year or grant period.

   Observations: The grants management system (MEGS) appears to have capacity and flexibility but is not integrated with the other layers of data management within CEPI and the MDE. There is a high cost of adding grants to the system.

   Recommendations: If and when the grants management system employs disaggregated student information in its analysis and decision making, the system should employ the same unique student ID as found in SRSD for data integration.

7. **School Finance Data** – This is a service application to collect financial data from LEAs, ISDs, school buildings, and programs each year. All school districts must report certain financial related data to the State. Either a flat file transfer to a relational database system, a SIF interface, or a Web-enabled data entry capability for districts that do not already have this information in electronic format should be provided.

   Observations: Here again, the State maintains a system and process (the Financial Information Database or FID) that will meet the needs as a source system to the ultimate data warehousing solution for DSS.

   Recommendations: Adopting the SIF standard will lower the total coast of data integration and sharing.

8. **Teacher Certification Management –** The certification database is a service application.

   Observations: As an information system, especially when viewed in conjunction with the State's human resource system that tracks educator work history and job assignments, License 2000, and the Registry of Educational Personnel (REP) meet the needs as a source system to the ultimate data warehousing solution for DSS. The State has just begun to link the databases associated with these two systems.

Recommendations: As the work on these systems progresses, look to automate the data flow from preparation institutions to L2K for recommending licensure. Also, data integration among these systems will require a universal, unique ID for educators and staff. Currently the REP uses a PIC but also requires either the credential number or the SSN for each educator file. Going forward this process needs to be rationalized and standardized. Lastly, the REP system may not include the "universe" of employees with perhaps some districts are underreporting non-professional staff and potentially teachers who are not highly qualified. If districts had underreported in the past, CEPI has no way of knowing who is missing. To audit and rebuild this file, work with the Office of Retirement Services to compare payment records with the REP list.

9. **Instructional Management System (IMS)** – This is a service application that links to the Standards Database and defines the curriculum scope, content (or links to content and pointers to hardcopy material), sequence, schedule and assessment criteria. It should be online, Web-based and built upon a relational system.

   Observations: Not in place today.

   Recommendations: Obtain an IMS system in line with the overall plan outlined in this report.

10. **Learning Standards Database** – This is a core application to publish State learning standards, course definitions, and recommended/restricted content (textbooks). This should be a relational data structure with the capability to easily extract (XML) or link standards definitions with other systems.

    Observations: Not in place today.

    Recommendations: Create a learning standards database and distribute via an educational portal.

11. **Assessment Database** – This is a core application to accept individual student and aggregated results from the assessment vendor to merge into decision support tools to support accountability determinations.

    Observations: MEAP data is well established and accessible but the process needs to be reengineered so that educators and school administrators can make use of that data for more-timely, proactive interventions. A complementary set of services for interim/formative assessments would also be highly desirable. All that being said, MEAP still meets the need as a source system to the ultimate data warehousing solution for DSS.

Recommendations: Integrate the sharing of assessment data with the Web services made available through the envisioned education portal.

12. **Data Warehouse** – This is a core application that draws data from operational databases to retain a snapshot of data at pre-determined intervals for archival purposes. It should contain all student demographic and assessment data, financial data, grants information, school and teacher information in separate but linked relational tables. The purpose of the data warehouse is analytics and reporting, not tracking operational or transactional data.

    Observations: A data warehouse is currently not in place today for the above mentioned subject areas. However, the State of Michigan does have an existing data warehouse solution that provides services for the FIA, DCH, and Treasury. The data warehouse contains information on welfare, child care and support, Medicaid, birth and immunization records, tax data and many other subject areas.

    Recommendations: Research a variety of data warehouse options, both internal and external to the State. Recommend a technical architecture for the data warehouse solution and thereafter design and construct an appropriate data warehousing service for student information as outlined in this report.

13. **Decision Support Tools** – This is a service application that is provided to the SEA, LEA, and school-level administrator/teacher for the purpose of easily extracting data from systems to allow them to make data driven decisions on a wide range of areas.

    Observations: Not in place today.

    Recommendations: As part of the data warehousing effort, provide a wide range of reports and ad hoc querying services via the education portal as outlined in this report.

Below, the reader will find a table that provides numerical ratings (0=totally absent to 3=exemplary) for the **current-state** Michigan application architecture. The ratings are shown by application and also by the underlying architecture layers that support each application. The rubrics for the CELT Team technical evaluation of the applications can be found in Appendix A of this report.

Applications that Support the Core Processes	Overall Application Rating	Application Layers:	1. Presentation/UI Tier	2. Application Tier	3. Transactional Data Tier	4. Persistent Data Store	5. Enterprise Interoperability	6. Decision Support/Reporting	7. Production Performance	8. TCO
1. Learning Standards	0		0	0	0	0	0	0	0	0
2. State Assessment Results Management	1.1		2	2	2	0	0	0	1	2
3. Certification Database	2		2	2	2	2	2	2	2	2
6. Data Warehouse	0		0	0	0	0	0	0	0	0
7. Decision Support Tools	0		0	0	0	0	0	0	0	0
4. Grant and Program Data Collection	2		2	2	2	2	1	1	2	2
5. End of Year Finance Data Collection	2		2	2	2	2	2	1	1	2
8. Enterprise Directory + Security Portal	2		2	2	2	2	2	2	2	2
9. Student ID + Record Collection	2.3		2	3	3	3	1.5	2	2	2
10. Safety and Discipline Information Data Collection	2		3	2	2	2	1	1	2	3
11. Classified Personnel Information	2		2	2	2	2	2	2	2	2
12. Facilities and Technology Plan Data Collection	2		2	2	2	2	2	2	2	2
Summary Scores	1.5		1.6	1.6	1.6	1.4	1.1	1.1	1.3	1.6

The table below describes the considerations for a "3" rating for each layer of the application architecture in the previous table. Considerations for application functionality and technical infrastructure are shown. Also shown in each row is the current technical architecture that supports the application layer for the MDE.

	Functional Considerations for a "3" Rating	Technical Considerations for a "3" Rating	Current Michigan Technical Architecture Components	Recommended Changes to the Technical Architecture
1. Presentation / UI Tier	The application is visually attractive, easily navigable, accessible to all types of users, and consistent with the rest of the site.	There is minimum desktop client, platform independence, responsive to the desktop.	Application and data management is siloed with little thought given to process and data integration/collaboration.	Develop a set of architected, coordinated solutions that revolve around Web delivery at the front end and data warehouse delivery at the back end, enabled through a enterprise directory and unique user ID process.
2. Application Tier	The workflow supported by the app closely maps to the target Core Process.	There is a current-state application server platform, current-state development tools, vendor support.	For new development, there does not appear to be an product of technical platform standardization or architecture.	Given the federated nature of IT application ownership, better governance at the process level and an enterprise view of the technical architecture and systems integration is called for.
3. Transactional Data Tier	A clear data model is documented and in place.	There is a relational DB, current-state data server, vendor supported tools	Various, including SQL Server, Oracle, Access, and Excel	Consideration should be given to establishing a comprehensive operational data store that contains current year data collection that is still in progress. This should be separate from the data warehouse but possess many of the same technical features, including extensive storage, secure back-up, high-speed, Web-enabled retrieval capabilities.

	Functional Considerations for a "3" Rating	Technical Considerations for a "3" Rating	Current Michigan Technical Architecture Components	Recommended Changes to the Technical Architecture
3. Transactional Data Tier (cont'd)				Standardizing on an Oracle platform makes sense given the price performance of the system and its availability within Wisconsin state government.
4. Persistent Data Store	Temporality, archiving, storage, and retrieval are optimized.	Uses optimized storage schema, data modeling tools, robust server architecture	None	Establish a data warehouse separate from the data collection systems. The data warehouse can then be used for data analysis and reporting without impacting the data collection process. When data is stable, it should be moved from the operational store to the data warehouse.
5. Enterprise Interoperability	All data is clearly and cleanly sourced and seamlessly integrated.	Uses robust network to the district, low-impact data collection tools	None	As applications are designed and built, they should use standards that provide for both vertical and horizontal interoperability as appropriate. No change to the current network approach. Adopt SIF standards across all WDPI Data Warehouse and Reporting services.

	Functional Considerations for a "3" Rating	Technical Considerations for a "3" Rating	Current Michigan Technical Architecture Components	Recommended Changes to the Technical Architecture
6. Decision Support/Reporting	The application provides reports and views of the data to drive key decisions.	Uses current-State report generation tool, data mining capability, separate operational data store (ODS)	Many reports are developed using Microsoft Office tools, such as Access and Excel.	Use a sophisticated end user tools such as those available from Cognos or Oracle to develop a wide range of standard reports and to enable those authorized to perform sophisticated ad hoc reports across all data collected by the SEA.
7. Production Performance	Staffing, bandwidth, load balancing, etc are handled such that response time is maintained.	High bandwidth to the districts, robust LAN at the DOE, network and server performance monitoring tools.	Staffing appears adequate for the current amount of data collected and analyzed. However the overall process and technical platform do not meet the needs of DSS, and are many times redundant and therefore wasteful of State resources.	Centralize data collection activities as additional data collection systems are introduced or expanded. Realign staffing to put the resources in the decision support unit and by removing from siloed data management encouraging all other departments to turn to the new data services under the CIO for authoritative, “clean” data.
8. Total Cost of Ownership	Licensing and staffing are optimized for lowest long-term costs.			TCO not an issue but the serious under funding of WDPI data management services has seriously hindered their ability to meet *NCLB Act* and *IDEA* requirements and more importantly to serve LEA, school and individual student needs.

4.0 Implementation Plan Summary

4.1 Overview and Action Plan Assumptions

Many of the recommendations from this report lend themselves to focused project implementations. As a general rule, recommendations that involve a significant amount of work across a number of government agencies over an extended period of time have been identified as projects. Each project should be assigned a sponsor from WDPI executive leadership and an accompanying project manager who has singular responsibility for project oversight, execution, and project team supervision and leadership. Each project should be allocated a project team, a project budget, and a clearly defined scope of work with accompanying milestone schedule. Also, a project oversight function should be implemented to periodically assess the status and resolve issues for all key projects. If possible, CCSSO's DSAC Team would also recommend the creation of a ***Project Management Office*** (PMO) function to ensure consistency of process and delivery across these large, complex, overlapping, and interconnected projects.

The table below identifies and briefly describes the eleven projects that are recommended by this report. Some of these are already underway in some manner. For example, Project 1 is underway as part of Michigan's membership in DSAC project and the services for UIC (Project 2) and e-Grants management (Project 10) already exist in some manner. Thus some of DSAC's recommendations build upon Michigan's emerging and firm foundation for decision support while others add and extend the State's DSS capabilities.

Project No.	Project Name	Project Description
Project 1	Data-Driven Decision Support Architecture Master Plan	This project will implement a project management process and project office and a system of aligned management processes and accompanying measures, targets, and tracking and reporting tools to support the other data driven decision support projects. The scope of this project will include the following: • Design and implement a Balanced Scorecard (BSC) that reflects the services and strategies of the State of Michigan stakeholders. This BSC is an operational planning and monitoring tool that will help identify and prioritize major projects and initiatives and track the impact on key performance indicators.

Project No.	Project Name	Project Description
Project 1 (cont'd)		• Implement a project management and plan management oversight process for use Statewide for all major DSS projects. • Align the BSC with the budget and performance appraisal process. • Implement a Continuous Improvement Process. • Establish DSS process governance and reporting. • Create a high-level but detailed roadmap to all DSS deliverables. • Define and achieve commitment from stakeholders as to their respective roles and responsibilities. • Establish a framework for the meta-data directory and overall database design. • Additional deliverables if DSAC were to execute this assignment, would include: – an overall data management strategy – a governance structure for data management – documented workflows and processes for data management, analysis and reporting – stakeholder roles and responsibilities in these data management processes – a logical architecture for source systems/data flows – a high-level logical diagram for educational data – a high-level metadata directory model – a technical architecture for an end-to-end data management solution, including related hardware and software recommendations that leverage existing State IT investments – a high-level project plan, including time lines, staffing levels and competency requirements, and associated costs/budgets for delivery of DSS solution components – components for associated DSS request for proposal (RFP) documents – ongoing consultation, project management and support in deal with DSS product/service vendors during the first year of DSS implementation

Project No.	Project Name	Project Description
Project 2	Extension of the UIC Process to all State Agency Systems of Record	This project really is one of process change and workflow adaptation in line with an existing service to ensure the universal adoption of the UIC among all State systems of record and to embrace educators and staff as well as students pre-K to 20. It is conceivable that the existing UIC infrastructure may need to be revised as well the data structures and processes within several State transaction data systems (e.g., MAERS, MI-CIS, MEDS, and CTEIS). Enhance the student data management system (SRSD) to provide the following benefits: • Single, shared source of core student demographic data • Data submission due dates align with program needs • Implementation without increasing the workload for schools and LEAs and MDOE program managers • Process that improve data quality at the point of entry through data validation routines prior to submission, and post-submission clean-up.
Project 3	Extended Directory Services	Extend the issuance of unique educator and staff IDs beyond the existing users to all appropriate LEA personnel so as to complement the student unique ID process, and to extend role authentication and permissions management. Merge the directory and authentication system of the existing secure portal with emerging DSS services and applications to make them available to school administrators, educators and State agency personnel as appropriate: The scope of this project is to: • Issue unique educator and staff IDs to complement the student unique ID process and extending role authentication and permissions management. • Provide interfaces to related applications to implement a single sign on for all DSS applications. • Provide training to all users.

Project No.	Project Name	Project Description
Project 4	Educational Portal and a comprehensive Web-services strategy	Create a master plan for Web-services that defines in detail the comprehensive and complementary offerings of the existing and new data services, including those for the envisioned MDE standards database, License 2000, REP, MEAP, MEGS, and so forth, such as data upload/download services, access control to LEA/school data marts, identity management services, instructional management services, learning resources access, etc. Through this same platform offer an educator workspace to include lesson plan development, instructional management, and other program delivery activities. This is a large project executed in phases to deliver the proper tools to the schools and districts. The project will deliver tools for: • maintaining state standards in a relational database • enabling districts to maintain curriculum and align resources to standards • providing best practice examples • integrating the curricular materials with assessments (diagnostic, formative, and summative) • developing and delivering online professional development and virtual courses whose results are maintained automatically in License 2000. • supporting data analysis to assist classroom instruction • virtual schools (course management) • supplement content (individual learning management) • digital content libraries, etc.
Project 5	MEAP Formative Assessments and Test Item Banks	• Develop a Web-based assessment platform delivered through the e-portal which will provide a choice of diagnostic and formative assessments for use by districts. It will draw on the substantial number of released MEAP test items. Once a diagnostic/formative assessment is developed by a district, it can be printed and scored, with the results entered in the application for further analysis. Remedial or extension resources can be recommended based on the results of the tests.

Project No.	Project Name	Project Description
Project 5 (cont'd)		• This project might be best addressed through the statewide use of a learning management system working in conjunction with an e-portal. • Phase 1 of this project would provide a searchable database application for the selection of past MEAP questions for use in LEA formative testing processes and a tool to build tests or at least a library of sample tests. • Phase 2 of this project would store and track student formative test results and analytical tools for analysis and decision-making by LEAs.
Project 6	Architected Platform for DSS	Building on the national architectural framework designed by DSAC and its member States, develop a comprehensive set of business (functional) and technical requirements for an end-to-end decision support system solution based upon DSAC's architectural frameworks and recommended standards. The outcomes of this project will be: • an assessment of existing DIT technical capabilities, services and products, as well as the State's IT architecture in light of the emerging DSS requirements; where gaps exist, identifying externally available products and services. • the identification of options and the framing of effective RFP's in line with the State's master data management plan. • throughout this process ensuring that stakeholders consider the total cost of ownership when selecting IT products and services • ensure that the ultimate solution is cost effective and in line with State needs and expectations for DSS services.
Project 7	Data Warehouse/Data Mart Platform	This project is to implement a data warehouse to retain historical data on student demographics, MEAP assessments, discipline, dropouts as well as additional information such as financial, teacher certification, assessment grants and program data that can be used to fundamentally drive student performance decisions at the classroom and student level. It should be designed to incorporate teacher information and class schedules in the future. The scope of the project should include the following:

Project No.	Project Name	Project Description
Project 7 (cont'd)		• Identification of the "customers" of the system. It is recommended that the district administrators (superintendents, principals and assistant principals and the district accountability coordinators) and CEPI staff be identified as the customers initially. • Identification of the types of questions that the data warehouse is to answer for its customers. • Identification of the sources of data for answering these questions. This must be cataloged, standardized, and documented in a data dictionary. • Determine what historical data should be included within the scope of this project. • Once this groundwork is laid, the design of the data table structures and the data collection methodology (i.e. ETL tools or SIF structures) and the specifications for the reporting tools should be completed. • Concurrent with the design of the data collection methodology is the definition of the policies for local accountability of data collection and quality. • Training and implementation planning, data conversion and production support are steps that follow in the project scope.
Project 8	Data Reporting and Analysis Platform	Provide enhanced reporting capabilities to State agencies and the LEAs to analyze and report off of the data warehouse. The tools can be used initially to report off of existing databases to provide access, analysis, and reporting where current capabilities are limited. • data marts • query tools and routines • standard reports • user training and support • user documentation

Project No.	Project Name	Project Description
Project 9	School Improvement Planner	Enable every school in the State to identify deficiencies, plan improvements, and measure the progress of their strategies to improve student learning through a Web-based application. This application would support school councils in developing and monitoring school improvement plans. It would allow them to establish measurable goals and develop strategies and responsibilities for implementing those goals. It would automatically make use of data from the data warehouse (attendance, MEAP and dialogistic/ formative scores, discipline, etc.) to inform goal setting as well as monitor progress to the goals. This tool will be updated on a regular (at least annual) basis as MEAP data is made available so as to provide data-derived benchmarks and metrics for each school planning team. This same system would also roll-up both planning objectives and associated performance results to better inform the MDE interventions team as they plan for the allocation of State resources and other services to the LEAs. Data collected via the tool will support *state mandates* such as Education Yes accreditation and compliance with NCLB and IDEA. Furthermore, the data derived from the School improvement Planner will allow for the longitudinal tracking of LEAs over time and in relation to MDE interventions, additional funding, and other actions on the part of the MDE.
Project 10	e-Grants and Financial Data	This project will streamline and rationalize existing grants management processes as well as extend the system so as to automate the workflows associated with both State and Federal granting processes, including: • a revised data model to better service DSS as appropriate. • deployment of data model changes as appropriate. • extend Web-enabled access for both State and Federal grants application processes. • automated tracking of application statuses via the Web. • integration with the DSS data warehouse for decision support purposes.

Project No.	Project Name	Project Description
Project 11	Project Management Office	Given the complexities, costs, and associated risks of DSS solution implementations, many DSAC State members have turned to DSAC to provide an objective third-party management layer to DSS delivery with the cost of this service scaled to the scope of the assignment. The services of the PMO might therefore encompass: • to ensure alignment between IT commitments and the agency's program and operational objectives. • to manage and coordinate overall IT project delivery and resource consumption. • to collect, codify, and disseminate best practices to service delivery and project teams. • to collect, document, and disseminate reusable components (such as project plans and budgets, commitment documents, technical specification templates, and the like) to project teams. • to measure and benchmark IT team performance. • to manage the project reporting requirements. • to communicate with stakeholders about project statuses, issues, and so on.

4.2 Five-Year Action Plan with Scenarios

The table below provides a quick view of the timing of each recommended project.

Project Name	Year 1	Year 2	Year 3	Year 4	Year 5
1. Data-Driven Decision Support Architecture Master Plan	X				
2. Extension of the UIC	X				
3. Extended Directory Services	X	X	X		
4. Educational Portal	X	X	X	X	
5. MEAP Formative Assessments and Test Item Banks	X	X	X		

Project Name	Year 1	Year 2	Year 3	Year 4	Year 5
6. Architected Platform for DSS	X				
7. Data Warehouse/Data Mart Platform		X	X	X	
8. Data Reporting and Analysis Platform		X	X	X	
9. School Improvement Planner	X	X	X		
10. e-Grants and Financial Data		X	X	X	
11. PMO	X	X	X	X	X

4.3 Estimated Project Costs

The table below provides a ***rough cost estimate*** for each project. Some assumptions are also provided. It is important to note that these estimates are rough, ball-park estimates and provided only to give the State an idea of the magnitude of effort and cost that could be expected from these efforts. Much work needs to be done to properly scope before a more accurate estimate can be provided for each project.

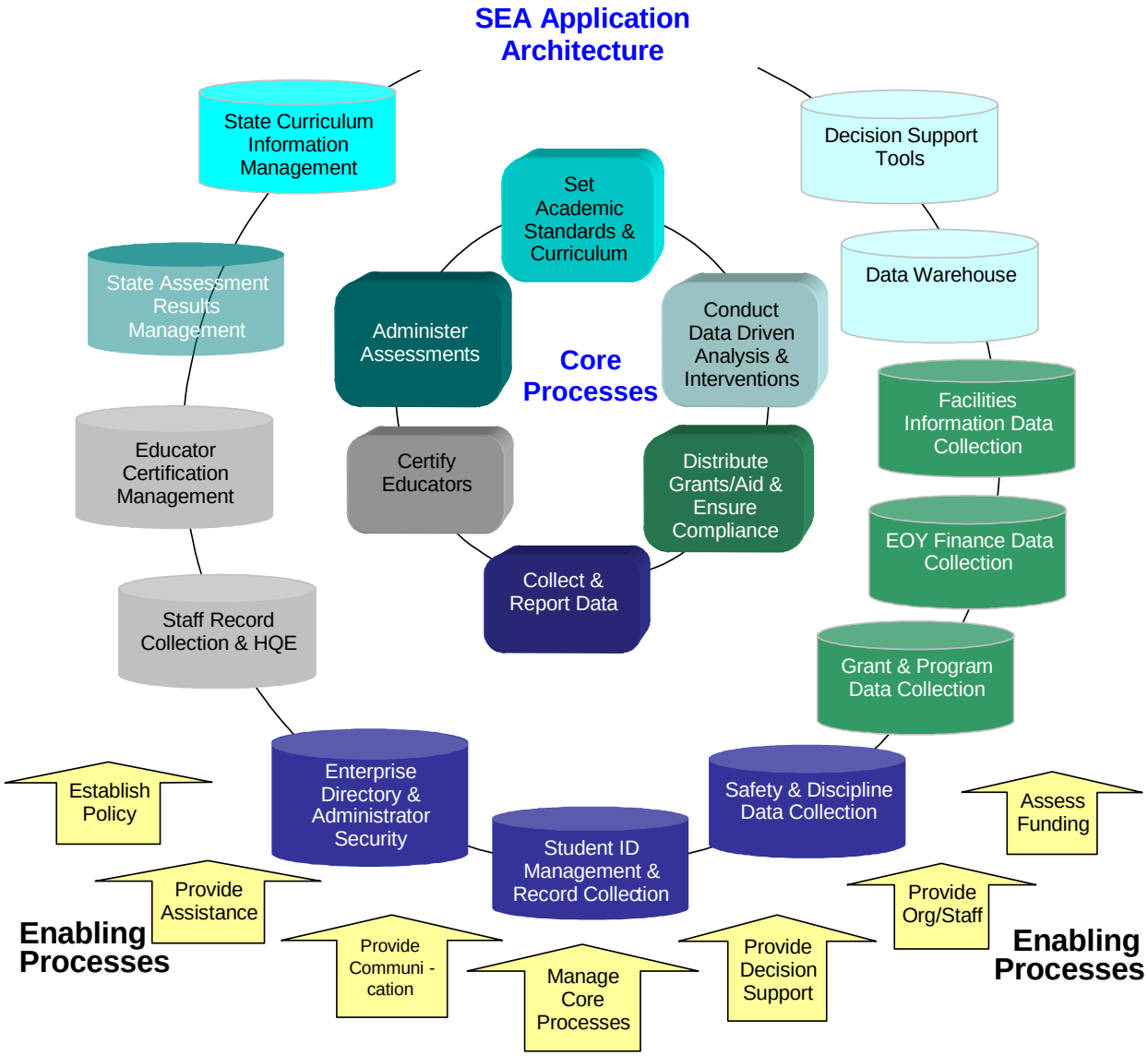
Project		Estimated Cost	Assumptions
Project 1	Data-Driven Decision Support Architecture Master Plan	$100-$150,000	• Process and tool design will generate approximately 50% of this project's associated cost. • The balance is required for implementation rollout and staff training and mentoring.
Project 2	Extension of the UIC	$250,000 or less	• Most of the effort here is in policy and process change. • Some additional programming may be required.
Project 3	Extended Directory Services	$200,000-400,000	• Costs assume internally developed systems integration with contract resources. • May entail the purchase of additional security software. • Will require added operational personnel during the implementation phase of the effort.

Project		Estimated Cost	Assumptions
Project 4	Educational Portal	$1- $2,000,000	• This project should evolve over a number of years from modest enhancements and extensions to a full-blown learning management system. • Initially, the effort would involve the DIT, CEPI, and DSAC teams and perhaps some additional external resources. • A true learning management systems approach would probably entail the purchase of a separate LMS at substantial cost.
Project 5	MEAP Formative Assessments and Test Item Banks	$100-$300,000	• Hardware and process and tool design will generate approximately 50% of this project's associated cost. • The balance is required for implementation rollout and staff training and mentoring.
Project 6	Architected Platform for DSS	$100,000-$200,000	• Initially, the effort would involve the DIT, CEPI, and DSAC teams and perhaps some additional external resources. • Most of the cost is in RFP development, the rest will leverage DSAC knowledge and existing documentation.
Project 7	Data Warehouse/Data Mart Platform	$7,000,000- $9,000,000	• hardware and software purchases • business rule gathering • database logical and physical design • data modeling and ETL effort • building of ODS, data warehouse, data marts • moving the data and operationalizing overall process • train personnel to maintain services going forward

Project		Estimated Cost	Assumptions
Project 8	Data Reporting and Analysis Platform	$1,500,000 – $2,500,000	• purchase necessary licenses • hire third parties to develop initial tool set. • establish ad hoc querying capability • training personnel
Project 9	School Improvement Planner	$1,000,000- $2,000,000 or less plus annual maintenance	• Purchase off the shelf product modified for the needs of the MDE and its LEAs. • Integrate with data warehouse and ODS or source systems.
Project 10	e-Grants and Financial Data	less than $250,000	• Adaptation of existing product • Integration with SRSD and other CEPI services.
Project 11	The Project Management Office	$50-100,000 per year plus ongoing membership in DSAC	• This service supplements the services of CEPI and DIT and is driven entirely by the demand for DSAC services.

5.0 Appendices

5.1 Appendix A: DSAC Framework and Rubrics



The DSAC Framework and Assessment Process

An effective architecture for state level decision support for improving and sustaining academic performance is comprised of the following key elements:

- **Core Processes** whose definition, support, and proper execution are critical to an effective decision support system geared to improving instruction.
- **Enabling Processes** that include those business, policy, staff development, communication, and organizational processes necessary for the organization to reach its goals.
- **An Applications Architecture** of databases and technology tools that comprise the information systems necessary for instructional improvement efforts.

There are six core processes and seven enabling processes that are necessary to assure individual student improvement for each student in Michigan. As described above in some detail, these core processes represent functions that have to be managed from the state, through the districts to the school to the classroom. Each of the processes has related information systems and database applications associated with them. The six core processes are:

1. **Academic Standards and Curriculum** – This process identifies, defines, refines, communicates, and monitors the State's standards for learning by subject and grade. In some States this includes the naming of courses and the establishment of course requirements. This process may also include statewide textbook selection and the selection of instructional management tools for the LEAs to use.
2. **Administer Performance Based and Standardized Assessments** – This is a process to define the performance criteria for students again State standards as well as a method for assessing and reporting each student's progress relative to these criteria.
3. **Certify Educators** – This is a process to document teacher and educational administrator competency levels as related to the State standards and to certify teachers who have achieved the proper level of competency.
4. **Conduct Data Driven Analysis and Interventions and Manage Accountability Systems** – This is the process for collecting and analyzing assessment data to identify and conduct interventions at the school, classroom, and student level. This process also includes defining expected performance levels for Districts, schools, and teachers, and holding them accountable for achieving these levels, with appropriate rewards for success.

5. **Distribute Grants/Aid and Ensure Compliance** – This is the process for collecting data and distributing funding to school districts either as direct State aid or through State or Federal grants. Grants may be either competitive or based on entitlement formulas. This process also ensures compliance with Federal and State requirements (such as Title I compliance).
6. **Collect and Report Data** – This is the process for collecting student, educator, and program/organization data from school districts relative to all aspect of educational program information.

Enabling processes are the softer policy and organizational elements that are essential to the effective functioning and results of the core processes. Each core process is supported by enabling processes. The following are the seven enabling processes.

1. Establish Policy
2. Provide Technical Assistance and Staff Development
3. Publish Information and Provide Communication
4. Manage Core Processes
5. Provide Enhanced Decision Support
6. Provide Organization/Staffing
7. Assess Funding Needs

To properly support and accomplish the core processes, all States need a set of twelve system components, at a minimum, to support *NCLB* and *IDEA* requirements. These systems are as follows:

1. **Enterprise Directory + Security Portal:** a set of synchronized LDAP and relational databases with distributed administration tools that maintain core information, authentication, and authorization data for school organizations and those educators/ administrators that require personalized access to state online applications.
2. **Student ID + Record Collection (SPED, Voc, etc.):** a system to register each student with the state, assign and maintain a unique ID, and collect individual student records at least several times a year.
3. **Educator Certification Management:** a system to register and license educators and maintain licensure information through a teacher's career.
4. **Staff Record Collection and Highly Qualified Determination**: a system to collect individual records linked to the state certification system for both licensed and unlicensed educators.
5. **State Curriculum Management (learning standards, courses):** a system to publish state learning standards, course definitions, and recommended/restricted content (textbooks).

6. **State Assessment Results Management:** each state needs a system to accept individual and aggregated results from their assessment vendor to merge into decision support tools to support accountability determinations.
7. **Grant and Program Data Collection:** states require applications to collect information from school and district personnel, above and beyond the individual student and staff records collected. Workflow can be enabled to utilize the Web to improve efficiency.
8. **End of Year Finance Data Collection:** states need to collect financial data from LEAs, school buildings, and Programs each year.
9. **Safety and Discipline Information Data Collection:** districts must report every incidence of violence through the state to the Federal government. Since an incident is not a characteristic of the student, a separate system needs to track each incident as it relates to above identified students.
10. **Facilities and Technology Plan Data Collection:** all school districts must report certain technology related data to the State. Many states require districts to report additional information related to facilities.
11. **Data Warehouse:** all of the above information must be stored in granular and structured format in an enterprise data warehouse.
12. **Decision Support Tools:** all of the data in the data warehouse must be made accessible to authenticated and unauthenticated users. Initially usage may be restricted to highly structured queries that fulfill reporting requirements. Eventually, State decision support environments will integrate with District environments to provide educators, students, and parents with broad access to data resources that will support student learning.

The applications architecture (databases, applications, and infrastructure) and their associated enabling processes may be integrated into a comprehensive view of hard and soft system elements within each of the Core Processes. The figure below shows the core processes and the interplay of the application architecture with the supporting enabling architecture.

In applying this framework to the data-driven decision support capabilities of the MDE, the DSAC team has employed a series of rubrics to systematically evaluate MDE's core processes through the quality of each core process' enabling processes, and the associated, supporting information technology applications and infrastructure. In the three tables that follow, the DSAC team provides these metrics so that the reader may appreciate the team's underlying methodology as well as the rationale for each assessment score. In total, these rubrics map to the DSAC decision support systems framework and align with the architectural elements of a complete solution set.

Enabling Process Rubrics:

	3	2	1	0
1. Establish Policies with Stakeholder Involvement	**All** statutes, regulations and policies directing LEA and SEA students and staff are in place to support the target environment and were developed with broad stakeholder involvement and clearly published on the Web.	**Most** statutes, regulations and policies directing LEA and SEA students and staff are developed with broad stakeholder involvement or clearly published on the Web.	**Some** statutes, regulations and policies directing LEA and SEA students and staff are developed with broad stakeholder involvement or clearly published on the Web.	**Few** statutes, regulations and policies directing LEA and SEA students and staff are developed with broad stakeholder involvement or clearly published on the Web.
2. Provide Technical Assistance and Staff Development	The State ensures that LEA staff receive top quality technical assistance and PD opportunities in **all** core areas.	The State ensures that LEA staff receive top quality technical assistance and PD opportunities in **most** core areas.	The State ensures that LEA staff receive top quality technical assistance and PD opportunities in **some** core areas.	The State ensures that LEA staff receive top quality technical assistance and PD opportunities in **few** of the core areas.
3. Publish Information and Provide Communication	The State effectively uses US Postal, e-mail, and the Web to communicate **all** key information LEAs need.	The State effectively uses US Postal, e-mail, and the Web to communicate **most** key information LEAs need.	The State effectively uses US Postal, e-mail, and the Web to communicate **some** key information LEAs need.	The State effectively uses US Postal, e-mail, and the Web to communicate **few** key information LEAs need.
4. Manage Internal Processes	**All** internal processes are well documented and managed for continuous improvement and total quality. Process ownership is clearly defined. Measures are routinely used to monitor process performance (Balanced Scorecard).	**Most** internal processes are well documented and managed for continuous improvement and total quality.	**Some** internal processes are well documented and managed for continuous improvement and total quality.	**Few** internal processes are well documented and managed for continuous improvement and total quality.
5. Use Data to Drive Decisions	Quantifiable data (in tables and graphs) drives **all** key decisions in this core process.	Data drives **most** key policy decisions.	Data drives **some** key policy decisions.	Data drives **few** key policy decisions. Policy is mostly driven by anecdote and belief.
6. Provide Organization / Staffing	**All** staff resources are adequate and effectively aligned to processes.	**Most** staff resources are adequate and effectively aligned to processes.	**Some** staff resources are adequate and effectively aligned to processes.	**Few** staff resources are adequate and effectively aligned to processes.
7. Assess Funding Needs	Both LEA and SEA staff report **ample resources** to accomplish their work successfully.	Financial constraints, while evident, are not the primary constraints.	Financial constraints top the long list of problems.	Both LEA and SEA staff report massive resource constraints substantially impacting

IT Application Rubrics:	3	2	1	0
1. State Curriculum Management	State maintains and publishes learning standards and associated curriculum materials (lessons, assessments, etc) in SIF v1.5 certified system.	State published learning standards as on parsed documents, but makes available a database of standards upon request.	State publishes learning standards as .doc, .pdf, or html with out parsing, name spacing, or mapping between versions.	Current learning standard documents are not readily available for download from the Web.
2. State Assessment Results Management	State uses SIF v1.5 to subscribe to assessment vendor for results and publish results through secure data warehouse. Parents are able to access their students' results with links to supportive resources.	State accepts results from assessment contractor in proprietary format, stores them in data warehouse, and makes them available to schools through primitive decision support tools.	State accepts results from assessment contractor in proprietary format and makes them available to schools on CD ROMS and/or print.	State is not able to process granular assessment data.
3. Educator Certification Management	All transactions related to educator licensure are available online. Dynamic access to certification data is linked with #7 below to determine Highly Qualified Teacher metrics.	Some transactions are available online. Certification data files are merged with #7 below to determine HQT.	Certification transactions are paper based. Districts have to merge data to create HQT reports.	Certification systems are non-functioning.
4. Enterprise Directory + Security Portal	Every educator, student and parent has a unique identity, log-in and personalized access to authorized data and applications.	SEA staff and LEA data reporting administrators have unique identity, log-in and personalized access to authorized data and applications.	Each SEA application makes use of its own organization generic log-in.	No capacity exists for authenticating secure access.

IT Application Rubrics:	3	2	1	0
5. Student ID + Record Collection	Districts can register students in local SIS synchronously with state IS system. All student level data is collected from district application through SIF interoperability or Web services. Aggregate reports are summarized by state system for district approval.	Each student is assigned a unique and consistent ID by the state through a stand alone system. Core student level data is collected as individual records, linkable across time. Migrant, foster care and other program data are captured through distinct, but linked systems.	Student data is primarily collected in aggregate or without a unique, state assigned ID.	Insufficient aggregate student data exists to comply with state or federal reporting requirements.
6. Safety and Discipline Information Data Collection	Districts are able to log each incident directly into the state system or through their SIS with both perpetrator and victim student IDs.	Individual incident data is collected via the Web, but not tied to student IDs.	Incident data is collected through aggregate reports.	Insufficient aggregate student data exists to comply with state or federal reporting requirements.
7. Staff Record Collection and Highly Qualified Determination	Districts report record level staff demographic and assignment data and the state is able to correlate between teachers and students in each class.	Districts report record level staff assignment and demographic data to the state. Either the district or state links certification data to determine HQT.	Districts report data in aggregate.	Insufficient aggregate educator data exists to comply with state or federal reporting requirements.
8. Facilities and Technology Plan Data Collection	Applications with local value are provided to capture tech plan and facilities data with standardized reporting to the state.	Web-based forms are used to collect district tech plan and facilities data.	Data is collected on paper.	Insufficient facilities and tech plan data exists to comply with state or federal reporting requirements.
9. Grant and Program Data Collection	Web-based forms merge decision-support data with grant objectives to drive school improvement.	Web-based forms are used to distribute, collect, audit and report grant related information.	Generic files are used to distribute and collect grant data.	Insufficient grant and program data exists to comply with state or federal reporting requirements.

IT Application Rubrics:	3	2	1	0
10. End of Year Finance Data Collection	Transaction level financial data is captured in standardized format to enable multi-dimensional analysis.	Summary financial data is collected through Web-based forms with internal intelligence.	Spreadsheets are used to collect financial data.	Insufficient financial data exists to comply with state or federal reporting requirements.
11. Data Warehouse	All state level data is maintained in an enterprise data warehouse with linkages to heterogeneous local data.	All state level data is maintained in an enterprise data warehouse.	Data is stored in silos.	No historical data exists.
12. Decision Support Tools	An integrated view of individual and grouped student performance, measuring growth over time and correlated to other factors is available to all authorized users.	Ad hoc querying of data cubes is available to authorized users.	School and district aggregate student performance profiles are available on the Web.	No information exists to support policy makers, educators, parents or students.

IT Infrastructure Rubrics:	**Functional Considerations for a "3" rating**	**Technical Considerations for a "3" rating**
1. Presentation /UI Tier	The application is visually attractive, easily navigable, accessible to all types of users, and consistent with the rest of the site.	minimum client, platform independent, responsive
2. Application Tier	The workflow supported by the app closely maps to the target Core Process.	current-state application server platform, current-state development tools, and vendor support.
3. Transactional Data Tier	A clear data model is documented and in place.	relational DB, current state data server, vendor tools
4. Persistent Data Store	Temporality, archiving, storage, and retrieval are optimized.	same as above
5. Enterprise Interoperability	All data is clearly and cleanly sources and seamlessly integrated.	robust network, low-impact data collection, one-time data entry
6. Decision Support/Reporting	The application provides reports and views of the data to drive key decisions.	current-state report generation tool, data mining capability, separate reporting from operation system.
7. Production Performance	Staffing, bandwidth, load balancing, etc are handles such that response time is maintained.	
8. Total Cost of Ownership	Licensing and staffing are optimized for lowest long-term costs.	

5.2 Appendix B: DSAC Knowledge Store URLs (*some are under construction at this time*)

DSAC Decision Support Frameworks and Architecture	under construction
DSAC Architectural Component Specifications	under construction
RFP Components	under construction
Best Practices	under construction
DSAC WHITE PAPERS:	
The Need for Quality Decision Support Architecture in K-12 Education	http://www.celtcorp.com/whitepapers/levinson03
Data, Data, Everywhere: The Case for a Data Architecture to Support State Decisions	http://www.celtcorp.com/whitepapers/mann04
Building a Consortial-based IT Solution: a Decision Support Architecture for State Education Agencies	http://www.celtcorp.com/whitepapers/kesner04
Decision Support Architecture Framework	http://www.celtcorp.com/whitepapers/team04

5.3 Appendix C: Michigan State Background Data

Document	URL
State Information	
DOE Information	http://www.michigan.gov/mde State Technology Plan: http://www.michigan.gov/documents/miplan2000_40662_7.pdf Michigan Public Schools Work!: http://www.mipublicschools.org/ Education Yes!: http://www.michigan.gov/mde/0,1607,7-140-22709_22877---,00.html MEAP: http://www.michigan.gov/mde/0,1607,7-140-22709_31168---,00.html MI-Access: http://www.michigan.gov/mde/0,1607,7-140-22709_28463---,00.html NAEP: http://www.michigan.gov/mde/0,1607,7-140-22709_32669---,00.html Ensuring Excellent Educators Report: http://www.michigan.gov/documents/Ensuring_35280_7.doc Filed Services: http://www.michigan.gov/mde/0,1607,7-140-6530_6559---,00.html Educators: http://www.michigan.gov/mde/0,1607,7-140-5234---,00.html Technology in Schools: http://www.michigan.gov/mde/0,1607,7-140-5235_5856_6079---,00.html
CPRE ~ Assessment and Accountability Systems: 50 States Profiles	http://www.cpre.org/Publications/mi.pdf
AYP	http://www.michigan.gov/mde/0,1607,7-140-22709_22875---,00.html http://www.michigan.gov/documents/04Schools_Not_Meeting_AYP_98335_7.pdf http://www.michigan.gov/documents/04Schools_Meeting_AYP_98332_7.pdf
Financial Information	http://www.michigan.gov/mde/0,1607,7-140-6530_6605---,00.html Office of Financial Management: http://www.michigan.gov/mde/0,1607,7-140-6530_25538_6563---,00.html

Document	URL
RFPs/Grants	http://www.michigan.gov/mde/0,1607,7-140-5236---,00.html
Assessment Letters	http://www.ed.gov/admins/lead/account/finalassess/mi.html http://www.ed.gov/admins/lead/account/finalassess/mich2.html http://www.ed.gov/admins/lead/account/finalassess/mi3.html
NCLB Decision Letter	http://www.ed.gov/admins/lead/account/letters/mi.doc http://www.ed.gov/admins/lead/account/letters/miaccapv2.doc
State Plan	http://www.ed.gov/admins/lead/account/stateplans03/micsa.pdf
Recent State Legislatures	Signed into law 05/2004, pre-K-12 Creates a parent involvement plan within school districts and public school academies designed to encourage parental participation. http://www.michiganlegislature.org/documents/2003-2004/publicact/pdf/2004-PA-0107.pdf, Title: S.B. 307, Source: StateNet
ECS NCLB ~ State Status	http://nclb2.ecs.org/NCLBSURVEY/nclb.aspx?Target=SM
Report Card	http://www.michigan.gov/documents/04Media_Reports_98331_7.xls http://www.michigan.gov/mde/0,1607,7-140-22709_25058---,00.html Math Grade 4: http://nces.ed.gov/nationsreportcard/pdf/stt2003/2004457MI4.pdf Math Grade 8: http://nces.ed.gov/nationsreportcard/pdf/stt2003/2004457MI8.pdf Reading Grade 4: http://nces.ed.gov/nationsreportcard/pdf/stt2003/2004456MI4.pdf Reading Grade 8: http://nces.ed.gov/nationsreportcard/pdf/stt2003/2004456MI8.pdf Science: http://nces.ed.gov/nationsreportcard/pdf/stt2000/2002453MI.pdf Writing Grade 4: http://nces.ed.gov/nationsreportcard/pdf/stt2002/writing/2003532MI4.pdf Writing Grade 8: http://nces.ed.gov/nationsreportcard/pdf/stt2002/writing/2003532MI8.pdf http://www.edweek.org/sreports/qc04/state.cfm?slug=17mi.h23 http://nces.ed.gov/nationsreportcard/states/profile.asp

Document	URL
PDMI Documents	http://evalsoft07.evalsoft.com/pbdmi/asp/MI If problems with link above: http://evalsoft07.evalsoft.com/pbdmi/doc-dmi/State_Report_Map.xls
NCEA ~ *Nine Essential Elements of Statewide Data-Collection Systems:* Survey Data	http://www.nc4ea.org/index.cfm?pg=surveyresults&subp=surveystate&surveyst=Michigan&CFID=42094&CFTOKEN=79985968
Achieve.org Review	http://www.achieve.org/achieve.nsf/4thMath.gif http://www.achieve.org/achieve.nsf/4thReading.gif http://www.achieve.org/achieve.nsf/8thReading.gif
Princeton ~ State Review	State by State Ranking: http://testprep.princetonreview.com/testingtesters/docs/state-by-state-rankings.doc State Data (Full Report): http://testprep.princetonreview.com/testingtesters/docs/2003_data_0402_v2.qxd.pdf Testing The Testers 2004 Report: http://testprep.princetonreview.com/testingtesters/docs/2003_MainReport.pdf Weighting Spreadsheet: http://testprep.princetonreview.com/testingtesters/docs/TtT_data_and_weighting.xls
American Federation of Teachers (NCLB) ~ State-by-State Resources	http://www.aft.org/topics/nclb/MI.htm
General Information	
ECS NCLB ~ National Grid	http://nclb2.ecs.org/NCLBSURVEY/nclb.aspx?Target=NG
NCES ~ *Technology in Schools*	http://nces.ed.gov/pubs2003/tech_schools/
Technology Counts 2003	http://www.edweek.com/ew/ewstory.cfm?slug=34tc_talkback.h22&keywords=Technology%20Counts

Document	URL
NCEA ~ *Nine Essential Elements of Statewide Data-Collection Systems*	http://www.nc4ea.org/files/9%20elements%20Brochure.pdf
PBDMI	http://evalsoft07.evalsoft.com/pbdmi/asp/datasource-102203.asp?RecId=A0D2E459
PBDMI Report Map	http://evalsoft07.evalsoft.com/pbdmi/doc-dmi/State_Report_Map.xls